

<110> Benner, Steven Albert

<120> Evolution-Based Functional Genomics

<130> file reference 10-765120

<140> 10/765,120

<141> 2004-01-28

<160> 38

<170> MacIntosh OS 10.3 Microsoft Word v. 2003

<210> 1

<211> 486

<212> PRT

<213> Tilapia nilotica

<400> 1

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| Met | Val | Leu | Glu | Met | Leu | Asn | Pro | Met | His | Tyr | Lys | Val | Thr | Ser |
| 5 | | | | | | | | 10 | | | | | 15 | |
| Met | Val | Ser | Glu | Val | Val | Pro | Phe | Ala | Ser | Ile | Ala | Val | Leu | Leu |
| | 20 | | | | | | | | 25 | | | | 30 | |
| Leu | Thr | Gly | Phe | Leu | Leu | Leu | Val | Trp | Asn | Tyr | Lys | Asn | Thr | Ser |
| | 35 | | | | | | | | 40 | | | | 45 | |
| Ser | Ile | Pro | Gly | Pro | Gly | Tyr | Phe | Leu | Gly | Ile | Gly | Pro | Leu | Ile |
| | 50 | | | | | | | | 55 | | | | 60 | |
| Ser | Tyr | Leu | Arg | Phe | Leu | Trp | Met | Gly | Ile | Gly | Ser | Ala | Cys | Asn |
| | 65 | | | | | | | 70 | | | | | 75 | |
| Tyr | Tyr | Asn | Lys | Thr | Tyr | Gly | Glu | Phe | Ile | Arg | Val | Trp | Ile | Gly |
| | 80 | | | | | | | 85 | | | | | 90 | |
| Gly | Glu | Glu | Thr | Leu | Ile | Ile | Ser | Lys | Ser | Ser | Ser | Val | Phe | His |
| | 95 | | | | | | | 100 | | | | | 105 | |
| Val | Met | Lys | His | Ser | His | Tyr | Thr | Ser | Arg | Phe | Gly | Ser | Lys | Pro |
| | 110 | | | | | | | 115 | | | | | 120 | |
| Gly | Leu | Gln | Phe | Ile | Gly | Met | His | Glu | Lys | Gly | Ile | Ile | Phe | Asn |
| | 125 | | | | | | | 130 | | | | | 135 | |
| Asn | Asn | Pro | Val | Leu | Trp | Lys | Ala | Val | Arg | Thr | Tyr | Phe | Met | Lys |
| | 140 | | | | | | | 145 | | | | | 150 | |
| Ala | Leu | Ser | Gly | Pro | Gly | Leu | Val | Arg | Met | Val | Thr | Val | Cys | Ala |
| | 155 | | | | | | | 160 | | | | | 165 | |
| Asp | Ser | Ile | Thr | Lys | His | Leu | Asp | Lys | Leu | Glu | Glu | Val | Arg | Asn |
| | 170 | | | | | | | 175 | | | | | 180 | |
| Asp | Leu | Gly | Tyr | Val | Asp | Val | Leu | Thr | Leu | Met | Arg | Arg | Ile | Met |
| | 185 | | | | | | | 190 | | | | | 195 | |
| Leu | Asp | Thr | Ser | Asn | Asn | Leu | Phe | Leu | Gly | Ile | Pro | Leu | Asp | Glu |
| | 200 | | | | | | | 205 | | | | | 210 | |
| Lys | Ala | Ile | Val | Cys | Lys | Ile | Gln | Gly | Tyr | Phe | Asp | Ala | Trp | Gln |



| 215 | 220 | 225 |
|-------------------------------------|---------------------|-----|
| Ala Leu Leu Leu Lys Pro Asp Ile Phe | Phe Lys Ile Pro Trp | Leu |
| 230 | 235 | 240 |
| Tyr Arg Lys Tyr Glu Lys Ser Val Lys | Asp Leu Lys Glu Asp | Met |
| 245 | 250 | 255 |
| Glu Ile Leu Ile Glu Lys Lys Arg Arg | Arg Ile Phe Thr Ala | Glu |
| 260 | 265 | 270 |
| Lys Leu Glu Asp Cys Met Asp Phe Ala | Thr Glu Leu Ile Leu | Ala |
| 275 | 280 | 285 |
| Glu Lys Arg Gly Glu Leu Thr Lys Glu | Asn Val Asn Gln Cys | Ile |
| 290 | 295 | 300 |
| Leu Glu Met Leu Ile Ala Ala Pro Asp | Thr Met Ser Val Thr | Val |
| 305 | 310 | 315 |
| Phe Phe Met Leu Phe Leu Ile Ala Lys | His Pro Gln Val Glu | Glu |
| 320 | 325 | 330 |
| Glu Leu Met Lys Glu Ile Gln Thr Val | Val Gly Glu Arg Asp | Ile |
| 335 | 340 | 345 |
| Arg Asn Asp Asp Met Gln Lys Leu Glu | Val Val Glu Asn Phe | Ile |
| 350 | 355 | 360 |
| Tyr Glu Ser Met Arg Tyr Gln Pro Val | Val Asp Leu Val Met | Arg |
| 365 | 370 | 375 |
| Lys Ala Leu Glu Asp Asp Val Ile Asp | Gly Tyr Pro Val Lys | Lys |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile Leu Asn Ile Gly | Arg Met His Arg Leu | Glu |
| 395 | 400 | 405 |
| Phe Phe Pro Lys Pro Asn Glu Phe Thr | Leu Glu Asn Phe Ala | Lys |
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro | Phe Gly Phe Gly Pro | Arg |
| 425 | 430 | 435 |
| Ala Cys Ala Gly Lys Tyr Ile Ala Met | Val Met Met Lys Val | Thr |
| 440 | 445 | 450 |
| Leu Val Ile Leu Leu Arg Arg Phe Gln | Val Gln Thr Pro Gln | Asp |
| 455 | 460 | 465 |
| Arg Cys Val Glu Lys Met Gln Lys Lys | Asn Asp Leu Ser Leu | His |
| 470 | 475 | 480 |
| Pro Asp Glu Thr Ser Gly | | |
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<211> 486

<212> PRT

<213> Oryzias latipes

<400> 2

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| Met Val Pro Glu Thr Val Thr Val Ser Ala | Met Pro Leu Leu Leu | |
| 20 | 25 | 30 |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Met | Gly | Leu | Leu | Leu | Ile | Trp | Asn | Cys | Glu | Ser | Ser | Ser | |
| | 35 | | | | | 40 | | | | 45 | | | | |
| Ser | Ile | Pro | Gly | Pro | Gly | Tyr | Cys | Leu | Gly | Ile | Gly | Pro | Leu | Ile |
| | 50 | | | | | 55 | | | | 60 | | | | |
| Ser | His | Gly | Arg | Phe | Leu | Trp | Met | Gly | Ile | Gly | Ser | Ala | Cys | Asn |
| | 65 | | | | | 70 | | | | 75 | | | | |
| Tyr | Tyr | Asn | Lys | Met | Tyr | Gly | Glu | Phe | Met | Arg | Val | Trp | Ile | Ser |
| | 80 | | | | | 85 | | | | 90 | | | | |
| Gly | Glu | Glu | Thr | Leu | Ile | Ile | Ser | Lys | Ser | Ser | Ser | Met | Phe | His |
| | 95 | | | | | 100 | | | | 105 | | | | |
| Val | Met | Lys | His | Ser | His | Tyr | Ile | Ser | Arg | Phe | Gly | Ser | Lys | Arg |
| | 110 | | | | | 115 | | | | 120 | | | | |
| Gly | Leu | Gln | Cys | Ile | Gly | Met | His | Glu | Asn | Gly | Ile | Ile | Phe | Asn |
| | 125 | | | | | 130 | | | | 135 | | | | |
| Asn | Asn | Pro | Ser | Leu | Trp | Arg | Thr | Ile | Arg | Pro | Phe | Phe | Met | Lys |
| | 140 | | | | | 145 | | | | 150 | | | | |
| Ala | Leu | Thr | Gly | Pro | Gly | Leu | Val | Arg | Met | Val | Glu | Val | Cys | Val |
| | 155 | | | | | 160 | | | | 165 | | | | |
| Glu | Ser | Ile | Lys | Gln | His | Leu | Asp | Arg | Leu | Gly | Glu | Val | Thr | Asp |
| | 170 | | | | | 175 | | | | 180 | | | | |
| Thr | Ser | Gly | Tyr | Val | Asp | Val | Leu | Thr | Leu | Met | Arg | His | Ile | Met |
| | 185 | | | | | 190 | | | | 195 | | | | |
| Leu | Asp | Thr | Ser | Asn | Met | Leu | Phe | Leu | Gly | Ile | Pro | Leu | Asp | Glu |
| | 200 | | | | | 205 | | | | 210 | | | | |
| Ser | Ala | Ile | Val | Lys | Lys | Ile | Gln | Gly | Tyr | Phe | Asn | Ala | Trp | Gln |
| | 215 | | | | | 220 | | | | 225 | | | | |
| Ala | Leu | Leu | Ile | Lys | Pro | Asn | Ile | Phe | Phe | Lys | Ile | Ser | Trp | Leu |
| | 230 | | | | | 235 | | | | 240 | | | | |
| Tyr | Arg | Lys | Tyr | Glu | Arg | Ser | Val | Lys | Asp | Leu | Lys | Asp | Glu | Ile |
| | 245 | | | | | 250 | | | | 255 | | | | |
| Ala | Val | Leu | Val | Glu | Lys | Lys | Arg | His | Lys | Val | Ser | Thr | Ala | Glu |
| | 260 | | | | | 265 | | | | 270 | | | | |
| Lys | Leu | Glu | Asp | Cys | Met | Asp | Phe | Ala | Thr | Asp | Leu | Ile | Phe | Ala |
| | 275 | | | | | 280 | | | | 285 | | | | |
| Glu | Arg | Arg | Gly | Asp | Leu | Thr | Lys | Glu | Asn | Val | Asn | Gln | Cys | Ile |
| | 290 | | | | | 295 | | | | 300 | | | | |
| Leu | Glu | Met | Leu | Ile | Ala | Ala | Pro | Asp | Thr | Met | Ser | Val | Thr | Leu |
| | 305 | | | | | 310 | | | | 315 | | | | |
| Tyr | Phe | Met | Leu | Leu | Leu | Val | Ala | Glu | Tyr | Pro | Glu | Val | Glu | Ala |
| | 320 | | | | | 325 | | | | 330 | | | | |
| Ala | Ile | Leu | Lys | Glu | Ile | His | Thr | Val | Val | Gly | Asp | Arg | Asp | Ile |
| | 335 | | | | | 340 | | | | 345 | | | | |
| Lys | Ile | Glu | Asp | Ile | Gln | Asn | Leu | Lys | Val | Val | Glu | Asn | Phe | Ile |
| | 350 | | | | | 355 | | | | 360 | | | | |
| Asn | Glu | Ser | Met | Arg | Tyr | Gln | Pro | Val | Val | Asp | Leu | Val | Met | Arg |
| | 365 | | | | | 370 | | | | 375 | | | | |
| Arg | Ala | Leu | Glu | Asp | Asp | Val | Ile | Asp | Gly | Tyr | Pro | Val | Lys | Lys |
| | 380 | | | | | 385 | | | | 390 | | | | |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Thr | Asn | Ile | Ile | Leu | Asn | Ile | Gly | Arg | Met | His | Arg | Leu | Glu |
| | | | 395 | | | | | 400 | | | | | 405 | |
| Tyr | Phe | Pro | Lys | Pro | Asn | Glu | Phe | Thr | Leu | Glu | Asn | Phe | Glu | Lys |
| | | | 410 | | | | | 415 | | | | | 420 | |
| Asn | Val | Pro | Tyr | Arg | Tyr | Phe | Gln | Pro | Phe | Gly | Phe | Gly | Pro | Arg |
| | | | 425 | | | | | 430 | | | | | 435 | |
| Gly | Cys | Ala | Gly | Lys | Tyr | Ile | Ala | Met | Val | Met | Met | Lys | Val | Val |
| | | | 440 | | | | | 445 | | | | | 450 | |
| Leu | Val | Thr | Leu | Leu | Arg | Arg | Phe | Gln | Val | Lys | Thr | Leu | Gln | Lys |
| | | | 455 | | | | | 460 | | | | | 465 | |
| Arg | Cys | Ile | Glu | Asn | Ile | Pro | Lys | Lys | Asn | Asp | Leu | Ser | Leu | His |
| | | | 470 | | | | | 475 | | | | | 480 | |
| Pro | Asn | Glu | Asp | Arg | His | | | | | | | | | |
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<211> 486

<212> PRT

<213> Danio rerio

<400> 3

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| Met | Ile | Leu | Glu | Met | Leu | Asn | Pro | Met | His | Tyr | Asn | Leu | Thr | Ser |
| | | | | 5 | | | | 10 | | | | | 15 | |
| Met | Val | Pro | Glu | Val | Met | Pro | Val | Ala | Thr | Leu | Pro | Ile | Leu | Leu |
| | | | | 20 | | | | 25 | | | | | 30 | |
| Leu | Thr | Gly | Phe | Leu | Phe | Phe | Val | Trp | Asn | His | Glu | Glu | Thr | Ser |
| | | | | 35 | | | | 40 | | | | | 45 | |
| Ser | Ile | Pro | Gly | Pro | Gly | Tyr | Cys | Met | Gly | Ile | Gly | Pro | Leu | Ile |
| | | | | 50 | | | | 55 | | | | | 60 | |
| Ser | His | Leu | Arg | Phe | Leu | Trp | Met | Gly | Leu | Gly | Ser | Ala | Cys | Asn |
| | | | | 65 | | | | 70 | | | | | 75 | |
| Tyr | Tyr | Asn | Lys | Met | Tyr | Gly | Glu | Phe | Val | Arg | Val | Trp | Ile | Ser |
| | | | | 80 | | | | 85 | | | | | 90 | |
| Gly | Glu | Glu | Thr | Leu | Val | Ile | Ser | Lys | Ser | Ser | Ser | Thr | Phe | His |
| | | | | 95 | | | | 100 | | | | | 105 | |
| Ile | Met | Lys | His | Asp | His | Tyr | Ser | Ser | Arg | Phe | Gly | Ser | Thr | Phe |
| | | | | 110 | | | | 115 | | | | | 120 | |
| Gly | Leu | Gln | Tyr | Met | Gly | Met | His | Glu | Asn | Gly | Val | Ile | Phe | Asn |
| | | | | 125 | | | | 130 | | | | | 135 | |
| Asn | Asn | Pro | Ala | Val | Trp | Lys | Ala | Leu | Arg | Pro | Phe | Phe | Val | Lys |
| | | | | 140 | | | | 145 | | | | | 150 | |
| Ala | Leu | Ser | Gly | Pro | Ser | Leu | Ala | Arg | Met | Val | Thr | Val | Cys | Val |
| | | | | 155 | | | | 160 | | | | | 165 | |
| Glu | Ser | Val | Asn | Asn | His | Leu | Asp | Arg | Leu | Asp | Glu | Val | Thr | Asn |
| | | | | 170 | | | | 175 | | | | | 180 | |
| Ala | Leu | Gly | His | Val | Asn | Val | Leu | Thr | Leu | Met | Arg | Arg | Thr | Met |
| | | | | 185 | | | | 190 | | | | | 195 | |
| Leu | Asp | Ala | Ser | Asn | Thr | Leu | Phe | Leu | Arg | Ile | Pro | Leu | Asp | Glu |

| | | |
|-------------------------------------|-------------------------|-----|
| 200 | 205 | 210 |
| Lys Asn Ile Val Leu Lys Ile Gln Gly | Tyr Phe Asp Ala Trp Gln | |
| 215 | 220 | 225 |
| Ala Leu Leu Ile Lys Pro Asn Ile Phe | Phe Lys Ile Ser Trp Leu | |
| 230 | 235 | 240 |
| Ser Arg Lys His Gln Lys Ser Ile Lys | Glu Leu Arg Asp Ala Val | |
| 245 | 250 | 255 |
| Gly Ile Leu Ala Glu Glu Lys Arg His | Arg Ile Phe Thr Ala Glu | |
| 260 | 265 | 270 |
| Lys Leu Glu Asp His Val Asp Phe Ala | Thr Asp Leu Ile Leu Ala | |
| 275 | 280 | 285 |
| Glu Lys Arg Gly Glu Leu Thr Lys Glu | Asn Val Asn Gln Cys Ile | |
| 290 | 295 | 300 |
| Leu Glu Met Met Ile Ala Ala Pro Asp | Thr Leu Ser Val Thr Val | |
| 305 | 310 | 315 |
| Phe Phe Met Leu Cys Leu Ile Ala Gln | His Pro Lys Val Glu Glu | |
| 320 | 325 | 330 |
| Ala Leu Met Lys Glu Ile Gln Thr Val | Leu Gly Glu Arg Asp Leu | |
| 335 | 340 | 345 |
| Lys Asn Asp Asp Met Gln Lys Leu Lys | Val Met Glu Asn Phe Ile | |
| 350 | 355 | 360 |
| Asn Glu Ser Met Arg Tyr Gln Pro Val | Val Asp Ile Val Met Arg | |
| 365 | 370 | 375 |
| Lys Ala Leu Glu Asp Asp Val Ile Asp | Gly Tyr Pro Val Lys Lys | |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile Leu Asn Ile Gly | Arg Met His Lys Leu Glu | |
| 395 | 400 | 405 |
| Phe Phe Pro Lys Pro Asn Glu Phe Thr | Leu Glu Asn Phe Glu Lys | |
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro | Phe Gly Phe Gly Pro Arg | |
| 425 | 430 | 435 |
| Ser Cys Ala Gly Lys Phe Ile Ala Met | Val Met Met Lys Val Met | |
| 440 | 445 | 450 |
| Leu Val Ser Leu Leu Arg Arg Phe His | Val Lys Thr Leu Gln Gly | |
| 455 | 460 | 465 |
| Asn Cys Leu Glu Asn Met Gln Lys Thr | Asn Asp Leu Ala Leu His | |
| 470 | 475 | 480 |
| Pro Asp Glu Ser Arg Ser | | |
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 <212> PRT
 <213> Carassius auratus

<400> 4

Val Leu Glu Leu Leu Met Gln Gly Ala His Asn Ser Ser Tyr Gly

Ala Gln Asp Asn Val Cys Gly Ala Met Ala Thr Leu Leu Leu Leu
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 Leu Leu Cys Leu Leu Ala Ile Arg His His Trp Thr Glu Lys
 35 40 45
 Asp His Val Pro Gly Pro Cys Phe Leu Leu Gly Leu Gly Pro Leu
 50 55 60
 Leu Ser Tyr Cys Arg Leu Ile Trp Ser Gly Ile Gly Thr Ala Ser
 65 70 75
 Asn Tyr Tyr Asn Ser Lys Tyr Gly Asp Ile Val Arg Val Trp Ile
 80 85 90
 Asn Gly Glu Glu Thr Leu Ile Leu Ser Arg Ser Ser Ala Val Tyr
 95 100 105
 His Val Leu Arg Lys Ser Leu Tyr Thr Ser Arg Phe Gly Ser Lys
 110 115 120
 Leu Gly Leu Gln Cys Ile Gly Met His Glu Gln Gly Ile Ile Phe
 125 130 135
 Asn Ser Asn Val Ala Leu Trp Lys Lys Val Arg Thr Phe Tyr Ala
 140 145 150
 Lys Ala Leu Thr Gly Pro Gly Leu Gln Arg Thr Leu Glu Ile Cys
 155 160 165
 Ile Thr Ser Thr Asn Thr His Leu Asp Asn Leu Ser His Leu Met
 170 175 180
 Asp Ala Arg Gly Gln Val Asp Ile Leu Asn Leu Leu Arg Cys Ile
 185 190 195
 Val Val Asp Ile Ser Asn Arg Leu Phe Leu Gly Val Pro Leu Asn
 200 205 210
 Glu His Asp Leu Leu Gln Lys Ile His Lys Tyr Phe Asp Thr Trp
 215 220 225
 Gln Thr Val Leu Ile Lys Pro Asp Val Tyr Phe Arg Leu Ala Trp
 230 235 240
 Trp Leu His Gly Lys His Lys Arg Asp Ala Gln Glu Leu Gln Asp
 245 250 255
 Ala Ile Ala Ala Leu Ile Glu Gln Lys Arg Val Gln Leu Thr Arg
 260 265 270
 Ala Glu Lys Phe Asp Gln Leu Asp Phe Thr Gly Glu Leu Ile Phe
 275 280 285
 Ala Gln Ser His Gly Glu Leu Ser Thr Glu Asn Val Arg Gln Cys
 290 295 300
 Val Leu Glu Met Ile Ile Ala Ala Pro Asp Thr Leu Ser Ile Ser
 305 310 315
 Leu Phe Phe Met Leu Leu Leu Lys Gln Asn Pro Asp Val Glu
 320 325 330
 Leu Lys Ile Leu Gln Glu Met Asn Ala Val Leu Ala Gly Arg Ser
 335 340 345
 Leu Gln His Ser His Leu Ser Gly Leu His Ile Leu Glu Ser Phe
 350 355 360
 Ile Asn Glu Ser Leu Arg Phe His Pro Val Val Asp Phe Thr Met
 365 370 375

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Arg | Ala | Leu | Asp | Asp | Asp | Val | Ile | Glu | Gly | Tyr | Glu | Val | Lys |
| | | | | 380 | | | | | 385 | | | | | 390 |
| Lys | Gly | Thr | Asn | Ile | Ile | Leu | Asn | Val | Gly | Arg | Met | His | Arg | Ser |
| | | | | 395 | | | | | 400 | | | | | 405 |
| Glu | Phe | Phe | Pro | Lys | Pro | Asn | Glu | Phe | Ser | Leu | Asp | Asn | Phe | Gln |
| | | | | 410 | | | | | 415 | | | | | 420 |
| Lys | Asn | Val | Pro | Ser | Arg | Phe | Phe | Gln | Pro | Phe | Gly | Ser | Gly | Pro |
| | | | | 425 | | | | | 430 | | | | | 435 |
| Arg | Ser | Cys | Val | Gly | Lys | His | Ile | Ala | Met | Val | Met | Met | Lys | Ser |
| | | | | 440 | | | | | 445 | | | | | 450 |
| Ile | Leu | Val | Thr | Leu | Leu | Ser | Arg | Phe | Ser | Val | Cys | Pro | Val | Lys |
| | | | | 455 | | | | | 460 | | | | | 465 |
| Gly | Cys | Thr | Val | Asp | Ser | Ile | Pro | Gln | Thr | Asn | Asp | Leu | Ser | Gln |
| | | | | 470 | | | | | 475 | | | | | 480 |
| Gln | Pro | Val | Glu | Glu | Pro | Ser | | | | | | | | |
| | | | | 485 | | | | | | | | | | |

<210> 5
<211> 484
<212> PRT
<213> Ictalurus punctatus

| | | | | | | | | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <400> 5 | | | | | | | | | | | | | | |
| Met | Glu | Glu | Val | Leu | Lys | Gly | Thr | Val | Asn | Phe | Ala | Ala | Thr | Val |
| | | | | | 5 | | | | 10 | | | | | 15 |
| Gln | Val | Thr | Leu | Met | Ala | Leu | Thr | Gly | Thr | Leu | Leu | Leu | Ile | Leu |
| | | | | | 20 | | | | 25 | | | | | 30 |
| Leu | His | Arg | Ile | Phe | Thr | Ala | Lys | Asn | Trp | Arg | Asn | Gln | Ser | Gly |
| | | | | | 35 | | | | 40 | | | | | 45 |
| Val | Pro | Gly | Pro | Gly | Trp | Leu | Leu | Gly | Leu | Gly | Pro | Ile | Met | Ser |
| | | | | | 50 | | | | 55 | | | | | 60 |
| Tyr | Ser | Arg | Phe | Leu | Trp | Met | Gly | Ile | Gly | Ser | Ala | Cys | Asn | Tyr |
| | | | | | 65 | | | | 70 | | | | | 75 |
| Tyr | Asn | Glu | Lys | Tyr | Gly | Ser | Ile | Ala | Arg | Val | Trp | Ile | Ser | Gly |
| | | | | | 80 | | | | 85 | | | | | 90 |
| Glu | Glu | Thr | Phe | Ile | Leu | Ser | Lys | Ser | Ser | Ala | Val | Tyr | His | Val |
| | | | | | 95 | | | | 100 | | | | | 105 |
| Leu | Lys | Ser | Asn | Asn | Tyr | Thr | Gly | Arg | Phe | Ala | Ser | Lys | Lys | Gly |
| | | | | | 110 | | | | 115 | | | | | 120 |
| Leu | Gln | Cys | Ile | Gly | Met | Phe | Glu | Gln | Gly | Ile | Ile | Phe | Asn | Ser |
| | | | | | 125 | | | | 130 | | | | | 135 |
| Asn | Met | Ala | Leu | Trp | Lys | Lys | Val | Arg | Thr | Tyr | Phe | Thr | Lys | Ala |
| | | | | | 140 | | | | 145 | | | | | 150 |
| Leu | Thr | Gly | Pro | Gly | Leu | Gln | Lys | Ser | Val | Asp | Val | Cys | Val | Ser |
| | | | | | 155 | | | | 160 | | | | | 165 |
| Ala | Thr | Asn | Lys | Gln | Leu | Asn | Val | Leu | Gln | Glu | Phe | Thr | Asp | His |
| | | | | | 170 | | | | 175 | | | | | 180 |
| Ser | Gly | His | Val | Asp | Val | Leu | Asn | Leu | Leu | Arg | Cys | Ile | Val | Val |

<110> Benner, Steven Albert

<120> Evolution-Based Functional Genomics

<140> 10/765,120

<141> 2004-01-28

<160> 38

<170> MacIntosh OS 10.3 Microsoft Word v. 2003

<210> 1

<211> 486

<212> PRT

<213> Tilapia nilotica

<400> 1

| | | | | | | | | | | | | | | | |
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| | | | | 005 | | | | 010 | | | | | 015 | | |
| Met | Val | Ser | Glu | Val | Val | Pro | Phe | Ala | Ser | Ile | Ala | Val | Leu | Leu | |
| | | | | 020 | | | | 025 | | | | | 030 | | |
| Leu | Thr | Gly | Phe | Leu | Leu | Leu | Val | Trp | Asn | Tyr | Lys | Asn | Thr | Ser | |
| | | | | 035 | | | | 040 | | | | | 045 | | |
| Ser | Ile | Pro | Gly | Pro | Gly | Tyr | Phe | Leu | Gly | Ile | Gly | Pro | Leu | Ile | |
| | | | | 050 | | | | 055 | | | | | 060 | | |
| Ser | Tyr | Leu | Arg | Phe | Leu | Trp | Met | Gly | Ile | Gly | Ser | Ala | Cys | Asn | |
| | | | | 065 | | | | 070 | | | | | 075 | | |
| Tyr | Tyr | Asn | Lys | Thr | Tyr | Gly | Glu | Phe | Ile | Arg | Val | Trp | Ile | Gly | |
| | | | | 080 | | | | 085 | | | | | 090 | | |
| Gly | Glu | Glu | Thr | Leu | Ile | Ile | Ser | Lys | Ser | Ser | Ser | Val | Phe | His | |
| | | | | 095 | | | | 100 | | | | | 105 | | |
| Val | Met | Lys | His | Ser | His | Tyr | Thr | Ser | Arg | Phe | Gly | Ser | Lys | Pro | |
| | | | | 110 | | | | 115 | | | | | 120 | | |
| Gly | Leu | Gln | Phe | Ile | Gly | Met | His | Glu | Lys | Gly | Ile | Ile | Phe | Asn | |
| | | | | 125 | | | | 130 | | | | | 135 | | |
| Asn | Asn | Pro | Val | Leu | Trp | Lys | Ala | Val | Arg | Thr | Tyr | Phe | Met | Lys | |
| | | | | 140 | | | | 145 | | | | | 150 | | |
| Ala | Leu | Ser | Gly | Pro | Gly | Leu | Val | Arg | Met | Val | Thr | Val | Cys | Ala | |
| | | | | 155 | | | | 160 | | | | | 165 | | |
| Asp | Ser | Ile | Thr | Lys | His | Leu | Asp | Lys | Leu | Glu | Glu | Val | Arg | Asn | |
| | | | | 170 | | | | 175 | | | | | 180 | | |
| Asp | Leu | Gly | Tyr | Val | Asp | Val | Leu | Thr | Leu | Met | Arg | Arg | Ile | Met | |
| | | | | 185 | | | | 190 | | | | | 195 | | |
| Leu | Asp | Thr | Ser | Asn | Asn | Leu | Phe | Leu | Gly | Ile | Pro | Leu | Asp | Glu | |
| | | | | 200 | | | | 205 | | | | | 210 | | |
| Lys | Ala | Ile | Val | Cys | Lys | Ile | Gln | Gly | Tyr | Phe | Asp | Ala | Trp | Gln | |
| | | | | 215 | | | | 220 | | | | | 225 | | |
| Ala | Leu | Leu | Leu | Lys | Pro | Asp | Ile | Phe | Phe | Lys | Ile | Pro | Trp | Leu | |
| | | | | 230 | | | | 235 | | | | | 240 | | |

Tyr Arg Lys Tyr Glu Lys Ser Val Lys Asp Leu Lys Glu Asp Met
 245 250 255
 Glu Ile Leu Ile Glu Lys Lys Arg Arg Arg Ile Phe Thr Ala Glu
 260 265 270
 Lys Leu Glu Asp Cys Met Asp Phe Ala Thr Glu Leu Ile Leu Ala
 275 280 285
 Glu Lys Arg Gly Glu Leu Thr Lys Glu Asn Val Asn Gln Cys Ile
 290 295 300
 Leu Glu Met Leu Ile Ala Ala Pro Asp Thr Met Ser Val Thr Val
 305 310 315
 Phe Phe Met Leu Phe Leu Ile Ala Lys His Pro Gln Val Glu Glu
 320 325 330
 Glu Leu Met Lys Glu Ile Gln Thr Val Val Gly Glu Arg Asp Ile
 335 340 345
 Arg Asn Asp Asp Met Gln Lys Leu Glu Val Val Glu Asn Phe Ile
 350 355 360
 Tyr Glu Ser Met Arg Tyr Gln Pro Val Val Asp Leu Val Met Arg
 365 370 375
 Lys Ala Leu Glu Asp Asp Val Ile Asp Gly Tyr Pro Val Lys Lys
 380 385 390
 Gly Thr Asn Ile Ile Leu Asn Ile Gly Arg Met His Arg Leu Glu
 395 400 405
 Phe Phe Pro Lys Pro Asn Glu Phe Thr Leu Glu Asn Phe Ala Lys
 410 415 420
 Asn Val Pro Tyr Arg Tyr Phe Gln Pro Phe Gly Phe Gly Pro Arg
 425 430 435
 Ala Cys Ala Gly Lys Tyr Ile Ala Met Val Met Met Lys Val Thr
 440 445 450
 Leu Val Ile Leu Leu Arg Arg Phe Gln Val Gln Thr Pro Gln Asp
 455 460 465
 Arg Cys Val Glu Lys Met Gln Lys Lys Asn Asp Leu Ser Leu His
 470 475 480
 Pro Asp Glu Thr Ser Gly
 485

<210> 2
 <211> 486
 <212> PRT
 <213> Oryzias latipes

<400> 2
 Met Phe Leu Glu Met Leu Asn Pro Met Gln Tyr Asn Val Thr Ile
 005 010 015
 Met Val Pro Glu Thr Val Thr Val Ser Ala Met Pro Leu Leu Leu
 020 025 030
 Ile Met Gly Leu Leu Leu Ile Trp Asn Cys Glu Ser Ser Ser
 035 040 045
 Ser Ile Pro Gly Pro Gly Tyr Cys Leu Gly Ile Gly Pro Leu Ile

| 050 | 055 | 060 |
|---------------------|---------------------|-----------------------------|
| Ser His Gly Arg | Phe Leu Trp Met Gly | Ile Gly Ser Ala Cys Asn |
| 065 | 070 | 075 |
| Tyr Tyr Asn Lys Met | Tyr Gly Glu Phe | Met Arg Val Trp Ile Ser |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu | Ile Ile Ser Lys | Ser Ser Ser Met Phe His |
| 095 | 100 | 105 |
| Val Met Lys His Ser | His Tyr Ile Ser | Arg Phe Gly Ser Lys Arg |
| 110 | 115 | 120 |
| Gly Leu Gln Cys Ile | Gly Met His Glu | Asn Gly Ile Ile Phe Asn |
| 125 | 130 | 135 |
| Asn Asn Pro Ser | Leu Trp Arg Thr | Ile Arg Pro Phe Phe Met Lys |
| 140 | 145 | 150 |
| Ala Leu Thr Gly Pro | Gly Leu Val Arg | Met Val Glu Val Cys Val |
| 155 | 160 | 165 |
| Glu Ser Ile Lys Gln | His Leu Asp Arg | Leu Gly Glu Val Thr Asp |
| 170 | 175 | 180 |
| Thr Ser Gly Tyr Val | Asp Val Leu Thr | Leu Met Arg His Ile Met |
| 185 | 190 | 195 |
| Leu Asp Thr Ser Asn | Met Leu Phe Leu | Gly Ile Pro Leu Asp Glu |
| 200 | 205 | 210 |
| Ser Ala Ile Val Lys | Lys Ile Gln Gly | Tyr Phe Asn Ala Trp Gln |
| 215 | 220 | 225 |
| Ala Leu Leu Ile Lys | Pro Asn Ile Phe | Phe Lys Ile Ser Trp Leu |
| 230 | 235 | 240 |
| Tyr Arg Lys Tyr Glu | Arg Ser Val Lys | Asp Leu Lys Asp Glu Ile |
| 245 | 250 | 255 |
| Ala Val Leu Val Glu | Lys Lys Arg His | Lys Val Ser Thr Ala Glu |
| 260 | 265 | 270 |
| Lys Leu Glu Asp Cys | Met Asp Phe Ala | Thr Asp Leu Ile Phe Ala |
| 275 | 280 | 285 |
| Glu Arg Arg Gly Asp | Leu Thr Lys Glu | Asn Val Asn Gln Cys Ile |
| 290 | 295 | 300 |
| Leu Glu Met Leu Ile | Ala Ala Pro Asp | Thr Met Ser Val Thr Leu |
| 305 | 310 | 315 |
| Tyr Phe Met Leu Leu | Leu Val Ala Glu | Tyr Pro Glu Val Glu Ala |
| 320 | 325 | 330 |
| Ala Ile Leu Lys Glu | Ile His Thr Val | Val Gly Asp Arg Asp Ile |
| 335 | 340 | 345 |
| Lys Ile Glu Asp Ile | Gln Asn Leu Lys | Val Val Glu Asn Phe Ile |
| 350 | 355 | 360 |
| Asn Glu Ser Met Arg | Tyr Gln Pro Val | Val Asp Leu Val Met Arg |
| 365 | 370 | 375 |
| Arg Ala Leu Glu Asp | Asp Val Ile Asp | Gly Tyr Pro Val Lys Lys |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile | Leu Asn Ile Gly | Arg Met His Arg Leu Glu |
| 395 | 400 | 405 |
| Tyr Phe Pro Lys Pro | Asn Glu Phe Thr | Leu Glu Asn Phe Glu Lys |

| | | |
|---|-----|-----|
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro Phe Gly Phe Gly Pro Arg | | |
| 425 | 430 | 435 |
| Gly Cys Ala Gly Lys Tyr Ile Ala Met Val Met Met Lys Val Val | | |
| 440 | 445 | 450 |
| Leu Val Thr Leu Leu Arg Arg Phe Gln Val Lys Thr Leu Gln Lys | | |
| 455 | 460 | 465 |
| Arg Cys Ile Glu Asn Ile Pro Lys Lys Asn Asp Leu Ser Leu His | | |
| 470 | 475 | 480 |
| Pro Asn Glu Asp Arg His | | |
| 485 | | |

<210> 3

<211> 486

<212> PRT

<213> Danio rerio

<400> 3

| | | |
|---|-----|-----|
| Met Ile Leu Glu Met Leu Asn Pro Met His Tyr Asn Leu Thr Ser | | |
| 005 | 010 | 015 |
| Met Val Pro Glu Val Met Pro Val Ala Thr Leu Pro Ile Leu Leu | | |
| 020 | 025 | 030 |
| Leu Thr Gly Phe Leu Phe Phe Val Trp Asn His Glu Glu Thr Ser | | |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Gly Tyr Cys Met Gly Ile Gly Pro Leu Ile | | |
| 050 | 055 | 060 |
| Ser His Leu Arg Phe Leu Trp Met Gly Leu Gly Ser Ala Cys Asn | | |
| 065 | 070 | 075 |
| Tyr Tyr Asn Lys Met Tyr Gly Glu Phe Val Arg Val Trp Ile Ser | | |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu Val Ile Ser Lys Ser Ser Ser Thr Phe His | | |
| 095 | 100 | 105 |
| Ile Met Lys His Asp His Tyr Ser Ser Arg Phe Gly Ser Thr Phe | | |
| 110 | 115 | 120 |
| Gly Leu Gln Tyr Met Gly Met His Glu Asn Gly Val Ile Phe Asn | | |
| 125 | 130 | 135 |
| Asn Asn Pro Ala Val Trp Lys Ala Leu Arg Pro Phe Phe Val Lys | | |
| 140 | 145 | 150 |
| Ala Leu Ser Gly Pro Ser Leu Ala Arg Met Val Thr Val Cys Val | | |
| 155 | 160 | 165 |
| Glu Ser Val Asn Asn His Leu Asp Arg Leu Asp Glu Val Thr Asn | | |
| 170 | 175 | 180 |
| Ala Leu Gly His Val Asn Val Leu Thr Leu Met Arg Arg Thr Met | | |
| 185 | 190 | 195 |
| Leu Asp Ala Ser Asn Thr Leu Phe Leu Arg Ile Pro Leu Asp Glu | | |
| 200 | 205 | 210 |
| Lys Asn Ile Val Leu Lys Ile Gln Gly Tyr Phe Asp Ala Trp Gln | | |
| 215 | 220 | 225 |

Ala Leu Leu Ile Lys Pro Asn Ile Phe Phe Lys Ile Ser Trp Leu
 230 235 240
 Ser Arg Lys His Gln Lys Ser Ile Lys Glu Leu Arg Asp Ala Val
 245 250 255
 Gly Ile Leu Ala Glu Glu Lys Arg His Arg Ile Phe Thr Ala Glu
 260 265 270
 Lys Leu Glu Asp His Val Asp Phe Ala Thr Asp Leu Ile Leu Ala
 275 280 285
 Glu Lys Arg Gly Glu Leu Thr Lys Glu Asn Val Asn Gln Cys Ile
 290 295 300
 Leu Glu Met Met Ile Ala Ala Pro Asp Thr Leu Ser Val Thr Val
 305 310 315
 Phe Phe Met Leu Cys Leu Ile Ala Gln His Pro Lys Val Glu Glu
 320 325 330
 Ala Leu Met Lys Glu Ile Gln Thr Val Leu Gly Glu Arg Asp Leu
 335 340 345
 Lys Asn Asp Asp Met Gln Lys Leu Lys Val Met Glu Asn Phe Ile
 350 355 360
 Asn Glu Ser Met Arg Tyr Gln Pro Val Val Asp Ile Val Met Arg
 365 370 375
 Lys Ala Leu Glu Asp Asp Val Ile Asp Gly Tyr Pro Val Lys Lys
 380 385 390
 Gly Thr Asn Ile Ile Leu Asn Ile Gly Arg Met His Lys Leu Glu
 395 400 405
 Phe Phe Pro Lys Pro Asn Glu Phe Thr Leu Glu Asn Phe Glu Lys
 410 415 420
 Asn Val Pro Tyr Arg Tyr Phe Gln Pro Phe Gly Phe Gly Pro Arg
 425 430 435
 Ser Cys Ala Gly Lys Phe Ile Ala Met Val Met Met Lys Val Met
 440 445 450
 Leu Val Ser Leu Leu Arg Arg Phe His Val Lys Thr Leu Gln Gly
 455 460 465
 Asn Cys Leu Glu Asn Met Gln Lys Thr Asn Asp Leu Ala Leu His
 470 475 480
 Pro Asp Glu Ser Arg Ser
 485

<210> 4
 <211> 487
 <212> PRT
 <213> Carassius auratus

<400> 4
 Val Leu Glu Leu Leu Met Gln Gly Ala His Asn Ser Ser Tyr Gly
 005 010 015
 Ala Gln Asp Asn Val Cys Gly Ala Met Ala Thr Leu Leu Leu
 020 025 030
 Leu Leu Cys Leu Leu Ala Ile Arg His His Trp Thr Glu Lys

035

040

045

Asp His Val Pro Gly Pro Cys Phe Leu Leu Gly Leu Gly Pro Leu
050 055 060
Leu Ser Tyr Cys Arg Leu Ile Trp Ser Gly Ile Gly Thr Ala Ser
065 070 075
Asn Tyr Tyr Asn Ser Lys Tyr Gly Asp Ile Val Arg Val Trp Ile
080 085 090
Asn Gly Glu Glu Thr Leu Ile Leu Ser Arg Ser Ser Ala Val Tyr
095 100 105
His Val Leu Arg Lys Ser Leu Tyr Thr Ser Arg Phe Gly Ser Lys
110 115 120
Leu Gly Leu Gln Cys Ile Gly Met His Glu Gln Gly Ile Ile Phe
125 130 135
Asn Ser Asn Val Ala Leu Trp Lys Lys Val Arg Thr Phe Tyr Ala
140 145 150
Lys Ala Leu Thr Gly Pro Gly Leu Gln Arg Thr Leu Glu Ile Cys
155 160 165
Ile Thr Ser Thr Asn Thr His Leu Asp Asn Leu Ser His Leu Met
170 175 180
Asp Ala Arg Gly Gln Val Asp Ile Leu Asn Leu Leu Arg Cys Ile
185 190 195
Val Val Asp Ile Ser Asn Arg Leu Phe Leu Gly Val Pro Leu Asn
200 205 210
Glu His Asp Leu Leu Gln Lys Ile His Lys Tyr Phe Asp Thr Trp
215 220 225
Gln Thr Val Leu Ile Lys Pro Asp Val Tyr Phe Arg Leu Ala Trp
230 235 240
Trp Leu His Gly Lys His Lys Arg Asp Ala Gln Glu Leu Gln Asp
245 250 255
Ala Ile Ala Ala Leu Ile Glu Gln Lys Arg Val Gln Leu Thr Arg
260 265 270
Ala Glu Lys Phe Asp Gln Leu Asp Phe Thr Gly Glu Leu Ile Phe
275 280 285
Ala Gln Ser His Gly Glu Leu Ser Thr Glu Asn Val Arg Gln Cys
290 295 300
Val Leu Glu Met Ile Ile Ala Ala Pro Asp Thr Leu Ser Ile Ser
305 310 315
Leu Phe Phe Met Leu Leu Leu Lys Gln Asn Pro Asp Val Glu
320 325 330
Leu Lys Ile Leu Gln Glu Met Asn Ala Val Leu Ala Gly Arg Ser
335 340 345
Leu Gln His Ser His Leu Ser Gly Leu His Ile Leu Glu Ser Phe
350 355 360
Ile Asn Glu Ser Leu Arg Phe His Pro Val Val Asp Phe Thr Met
365 370 375
Arg Arg Ala Leu Asp Asp Asp Val Ile Glu Gly Tyr Glu Val Lys
380 385 390
Lys Gly Thr Asn Ile Ile Leu Asn Val Gly Arg Met His Arg Ser

| | | |
|---|-----|-----|
| 395 | 400 | 405 |
| Glu Phe Phe Pro Lys Pro Asn Glu Phe Ser Leu Asp Asn Phe Gln | | |
| 410 | 415 | 420 |
| Lys Asn Val Pro Ser Arg Phe Phe Gln Pro Phe Gly Ser Gly Pro | | |
| 425 | 430 | 435 |
| Arg Ser Cys Val Gly Lys His Ile Ala Met Val Met Met Lys Ser | | |
| 440 | 445 | 450 |
| Ile Leu Val Thr Leu Leu Ser Arg Phe Ser Val Cys Pro Val Lys | | |
| 455 | 460 | 465 |
| Gly Cys Thr Val Asp Ser Ile Pro Gln Thr Asn Asp Leu Ser Gln | | |
| 470 | 475 | 480 |
| Gln Pro Val Glu Glu Pro Ser | | |
| 485 | | |

<210> 5
 <211> 484
 <212> PRT
 <213> Ictalurus punctatus

| | | |
|---|-----|-----|
| <400> 5 | | |
| Met Glu Glu Val Leu Lys Gly Thr Val Asn Phe Ala Ala Thr Val | | |
| 005 | 010 | 015 |
| Gln Val Thr Leu Met Ala Leu Thr Gly Thr Leu Leu Leu Ile Leu | | |
| 020 | 025 | 030 |
| Leu His Arg Ile Phe Thr Ala Lys Asn Trp Arg Asn Gln Ser Gly | | |
| 035 | 040 | 045 |
| Val Pro Gly Pro Gly Trp Leu Leu Gly Leu Gly Pro Ile Met Ser | | |
| 050 | 055 | 060 |
| Tyr Ser Arg Phe Leu Trp Met Gly Ile Gly Ser Ala Cys Asn Tyr | | |
| 065 | 070 | 075 |
| Tyr Asn Glu Lys Tyr Gly Ser Ile Ala Arg Val Trp Ile Ser Gly | | |
| 080 | 085 | 090 |
| Glu Glu Thr Phe Ile Leu Ser Lys Ser Ser Ala Val Tyr His Val | | |
| 095 | 100 | 105 |
| Leu Lys Ser Asn Asn Tyr Thr Gly Arg Phe Ala Ser Lys Lys Gly | | |
| 110 | 115 | 120 |
| Leu Gln Cys Ile Gly Met Phe Glu Gln Gly Ile Ile Phe Asn Ser | | |
| 125 | 130 | 135 |
| Asn Met Ala Leu Trp Lys Lys Val Arg Thr Tyr Phe Thr Lys Ala | | |
| 140 | 145 | 150 |
| Leu Thr Gly Pro Gly Leu Gln Lys Ser Val Asp Val Cys Val Ser | | |
| 155 | 160 | 165 |
| Ala Thr Asn Lys Gln Leu Asn Val Leu Gln Glu Phe Thr Asp His | | |
| 170 | 175 | 180 |
| Ser Gly His Val Asp Val Leu Asn Leu Leu Arg Cys Ile Val Val | | |
| 185 | 190 | 195 |
| Asp Val Ser Asn Arg Leu Phe Leu Arg Ile Pro Leu Asn Glu Lys | | |
| 200 | 205 | 210 |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Leu | Leu | Ile | Lys | Ile | His | Arg | Tyr | Phe | Ser | Thr | Trp | Gln | Ala |
| | 215 | | | | | | | | 220 | | | | | 225 |
| Val | Leu | Ile | Gln | Pro | Asp | Val | Phe | Phe | Arg | Leu | Asn | Phe | Val | Tyr |
| | 230 | | | | | | | | 235 | | | | | 240 |
| Lys | Lys | Tyr | His | Leu | Ala | Ala | Lys | Glu | Leu | Gln | Asp | Glu | Met | Gly |
| | 245 | | | | | | | | 250 | | | | | 255 |
| Lys | Leu | Val | Glu | Gln | Lys | Arg | Gln | Ala | Ile | Asn | Asn | Met | Glu | Lys |
| | 260 | | | | | | | | 265 | | | | | 270 |
| Leu | Asp | Glu | Thr | Asp | Phe | Ala | Thr | Glu | Leu | Ile | Phe | Ala | Gln | Asn |
| | 275 | | | | | | | | 280 | | | | | 285 |
| His | Asp | Glu | Leu | Ser | Val | Asp | Asp | Val | Arg | Gln | Cys | Val | Leu | Glu |
| | 290 | | | | | | | | 295 | | | | | 300 |
| Met | Val | Ile | Ala | Ala | Pro | Asp | Thr | Leu | Ser | Ile | Ser | Leu | Phe | Phe |
| | 305 | | | | | | | | 310 | | | | | 315 |
| Met | Leu | Leu | Leu | Leu | Lys | Gln | Asn | Ser | Val | Val | Glu | Glu | Gln | Ile |
| | 320 | | | | | | | | 325 | | | | | 330 |
| Val | Gln | Glu | Ile | Gln | Ser | Gln | Ile | Gly | Glu | Arg | Asp | Val | Glu | Ser |
| | 335 | | | | | | | | 340 | | | | | 345 |
| Ala | Asp | Leu | Gln | Lys | Leu | Asn | Val | Leu | Glu | Arg | Phe | Ile | Lys | Glu |
| | 350 | | | | | | | | 355 | | | | | 360 |
| Ser | Leu | Arg | Phe | His | Pro | Val | Val | Asp | Phe | Ile | Met | Arg | Arg | Ala |
| | 365 | | | | | | | | 370 | | | | | 375 |
| Leu | Glu | Asp | Asp | Glu | Ile | Asp | Gly | Tyr | Arg | Val | Ala | Lys | Gly | Thr |
| | 380 | | | | | | | | 385 | | | | | 390 |
| Asn | Leu | Ile | Leu | Asn | Ile | Gly | Arg | Met | His | Lys | Ser | Glu | Phe | Phe |
| | 395 | | | | | | | | 400 | | | | | 405 |
| Gln | Lys | Pro | Asn | Glu | Phe | Asn | Leu | Glu | Asn | Phe | Glu | Asn | Thr | Val |
| | 410 | | | | | | | | 415 | | | | | 420 |
| Pro | Ser | Arg | Tyr | Phe | Gln | Pro | Phe | Gly | Cys | Gly | Pro | Arg | Ala | Cys |
| | 425 | | | | | | | | 430 | | | | | 435 |
| Val | Gly | Lys | His | Ile | Ala | Met | Val | Met | Thr | Lys | Ala | Ile | Leu | Val |
| | 440 | | | | | | | | 445 | | | | | 450 |
| Thr | Leu | Leu | Ser | Arg | Phe | Thr | Val | Cys | Pro | Arg | His | Gly | Cys | Thr |
| | 455 | | | | | | | | 460 | | | | | 465 |
| Val | Ser | Thr | Ile | Lys | Gln | Thr | Asn | Asn | Leu | Ser | Met | Gln | Pro | Val |
| | 470 | | | | | | | | 475 | | | | | 480 |
| Glu | Glu | Asp | Pro | | | | | | | | | | | |

<210> 6

<211> 486

<212> PRT

<213> Carassius auratus

<400> 6

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Val | Asp | Leu | Leu | Ile | Gln | Arg | Ala | His | Asn | Gly | Thr | Glu | Arg |
| | 005 | | | | | | | | 010 | | | | | 015 |
| Ala | Gln | Asp | Asn | Ala | Cys | Gly | Ala | Thr | Ala | Thr | Ile | Leu | Leu | Leu |
| | 020 | | | | | | | | 025 | | | | | 030 |

Leu Leu Cys Leu Leu Ala Ile Arg His His Arg Pro His Lys
035 040 045
Ser His Ile Pro Gly Pro Ser Phe Phe Phe Gly Leu Gly Pro Val
050 055 060
Val Ser Tyr Cys Arg Phe Ile Trp Ser Gly Ile Gly Thr Ala Ser
065 070 075
Asn Tyr Tyr Asn Ser Lys Tyr Gly Asp Ile Val Arg Val Trp Ile
080 085 090
Asn Gly Glu Glu Thr Leu Ile Leu Ser Arg Ser Ser Ala Val Tyr
095 100 105
His Val Leu Arg Lys Ser Leu Tyr Thr Ser Arg Phe Gly Ser Lys
110 115 120
Leu Gly Leu Gln Cys Ile Gly Met His Glu Gln Gly Ile Ile Phe
125 130 135
Asn Ser Asn Val Ala Leu Trp Lys Lys Val Arg Ala Phe Tyr Ala
140 145 150
Lys Ala Leu Thr Gly Pro Gly Leu Gln Arg Thr Met Glu Ile Cys
155 160 165
Thr Thr Ser Thr Asn Ser His Leu Asp Asp Leu Ser Gln Leu Thr
170 175 180
Asp Ala Gln Gly Gln Leu Asp Ile Leu Asn Leu Leu Arg Cys Ile
185 190 195
Val Val Asp Val Ser Asn Arg Leu Phe Leu Gly Val Pro Leu Asn
200 205 210
Glu His Asp Leu Leu Gln Lys Ile His Lys Tyr Phe Asp Thr Trp
215 220 225
Gln Thr Val Leu Ile Lys Pro Asp Val Tyr Phe Arg Leu Asp Trp
230 235 240
Leu His Arg Lys His Lys Arg Asp Ala Gln Glu Leu Gln Asp Ala
245 250 255
Ile Thr Ala Leu Ile Glu Gln Lys Lys Val Gln Leu Ala His Ala
260 265 270
Glu Lys Leu Asp His Leu Asp Phe Thr Ala Glu Leu Ile Phe Ala
275 280 285
Gln Ser His Gly Glu Leu Ser Ala Glu Asn Val Arg Gln Cys Val
290 295 300
Leu Glu Met Val Ile Ala Ala Pro Asp Thr Leu Ser Ile Ser Leu
305 310 315
Phe Phe Met Leu Leu Leu Lys Gln Asn Pro Asp Val Glu Leu
320 325 330
Lys Ile Leu Gln Glu Met Asp Ser Val Leu Ala Gly Gln Ser Leu
335 340 345
Gln His Ser His Leu Ser Lys Leu Gln Ile Leu Glu Ser Phe Ile
350 355 360
Asn Glu Ser Leu Arg Phe His Pro Val Val Asp Phe Thr Met Arg
365 370 375
Arg Ala Leu Asp Asp Asp Val Ile Glu Gly Tyr Asn Val Lys Lys
380 385 390

Gly Thr Asn Ile Ile Leu Asn Val Gly Arg Met His Arg Ser Glu
 395 400 405
 Phe Phe Ser Lys Pro Asn Gln Phe Ser Leu Asp Asn Phe His Lys
 410 415 420
 Asn Val Pro Ser Arg Phe Phe Gln Pro Phe Gly Ser Gly Pro Arg
 425 430 435
 Ser Cys Val Gly Lys His Ile Ala Met Val Met Met Lys Ser Ile
 440 445 450
 Leu Val Ala Leu Leu Ser Arg Phe Ser Val Cys Pro Met Lys Ala
 455 460 465
 Cys Thr Val Glu Asn Ile Pro Gln Thr Asn Asn Leu Ser Gln Gln
 470 475 480
 Pro Val Glu Glu Pro Ser
 485

<210> 7
 <211> 486
 <212> PRT
 <213> Sus scrofa (pig) placental

<400> 7

Met Val Leu Glu Met Leu Asn Pro Met Tyr Tyr Lys Ile Thr Ser
 005 010 015
 Met Val Ser Glu Val Val Pro Phe Ala Ser Ile Ala Val Leu Leu
 020 025 030
 Leu Thr Gly Phe Leu Leu Leu Trp Asn Tyr Glu Asn Thr Ser
 035 040 045
 Ser Ile Pro Ser Pro Gly Tyr Phe Leu Gly Ile Gly Pro Leu Ile
 050 055 060
 Ser His Phe Arg Phe Leu Trp Met Gly Ile Gly Ser Ala Cys Asn
 065 070 075
 Tyr Tyr Asn Glu Met Tyr Gly Glu Phe Met Arg Val Trp Ile Gly
 080 085 090
 Gly Glu Glu Thr Leu Ile Ile Ser Lys Ser Ser Ser Val Phe His
 095 100 105
 Val Met Lys His Ser His Tyr Thr Ser Arg Phe Gly Ser Lys Pro
 110 115 120
 Gly Leu Glu Cys Ile Gly Met Tyr Glu Lys Gly Ile Ile Phe Asn
 125 130 135
 Asn Asp Pro Ala Leu Trp Lys Ala Val Arg Thr Tyr Phe Met Lys
 140 145 150
 Ala Leu Ser Gly Pro Gly Leu Val Arg Met Val Thr Val Cys Ala
 155 160 165
 Asp Ser Ile Thr Lys His Leu Asp Lys Leu Glu Glu Val Arg Asn
 170 175 180
 Asp Leu Gly Tyr Val Asp Val Leu Thr Leu Met Arg Arg Ile Met
 185 190 195
 Leu Asp Thr Ser Asn Asn Leu Phe Leu Gly Ile Pro Leu Asp Glu

| | | |
|-------------------------------------|-------------------------|-----|
| 200 | 205 | 210 |
| Lys Ala Ile Val Cys Lys Ile Gln Gly | Tyr Phe Asp Ala Trp Gln | |
| 215 | 220 | 225 |
| Ala Leu Leu Leu Lys Pro Glu Phe Phe | Phe Lys Phe Ser Trp Leu | |
| 230 | 235 | 240 |
| Tyr Lys Lys His Lys Glu Ser Val Lys | Asp Leu Lys Glu Asn Met | |
| 245 | 250 | 255 |
| Glu Ile Leu Ile Glu Lys Lys Arg Cys | Ser Ile Ile Thr Ala Glu | |
| 260 | 265 | 270 |
| Lys Leu Glu Asp Cys Met Asp Phe Ala | Thr Glu Leu Ile Leu Ala | |
| 275 | 280 | 285 |
| Glu Lys Arg Gly Glu Leu Thr Lys Glu | Asn Val Asn Gln Cys Ile | |
| 290 | 295 | 300 |
| Leu Glu Met Leu Ile Ala Ala Pro Asp | Thr Leu Ser Val Thr Val | |
| 305 | 310 | 315 |
| Phe Phe Met Leu Phe Leu Ile Ala Lys | His Pro Gln Val Glu Glu | |
| 320 | 325 | 330 |
| Ala Ile Val Lys Glu Ile Gln Thr Val | Ile Gly Glu Arg Asp Ile | |
| 335 | 340 | 345 |
| Arg Asn Asp Asp Met Gln Lys Leu Lys | Val Val Glu Asn Phe Ile | |
| 350 | 355 | 360 |
| Tyr Glu Ser Met Arg Tyr Gln Pro Val | Val Asp Leu Val Met Arg | |
| 365 | 370 | 375 |
| Lys Ala Leu Glu Asp Asp Val Ile Asp | Gly Tyr Pro Val Lys Lys | |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile Leu Asn Ile Gly | Arg Met His Arg Leu Glu | |
| 395 | 400 | 405 |
| Phe Phe Pro Lys Pro Asn Glu Phe Thr | Leu Glu Asn Phe Ala Lys | |
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro | Phe Gly Phe Gly Pro Arg | |
| 425 | 430 | 435 |
| Ala Cys Ala Gly Lys Tyr Ile Ala Met | Val Met Met Lys Val Thr | |
| 440 | 445 | 450 |
| Leu Val Ile Leu Leu Arg Arg Phe Gln | Val Gln Thr Pro Gln Asp | |
| 455 | 460 | 465 |
| Arg Cys Val Glu Lys Met Gln Lys Lys | Asn Asp Leu Ser Leu His | |
| 470 | 475 | 480 |
| Pro Asp Glu Thr Ser Gly | | |
| 485 | | |

<210> 8
 <211> 476
 <212> PRT
 <213> Sus scrofa (pig) embryo

<400> 8
 Leu Val Ser Ile Ala Pro Asn Thr Thr Val Gly Leu Pro Ser Gly
 005 010 015

Ile Pro Met Ala Thr Arg Ser Leu Ile Leu Leu Val Cys Leu Leu
020 025 030
Leu Met Val Trp Ser His Ser Glu Lys Lys Thr Ile Pro Gly Pro
035 040 045
Ser Phe Cys Leu Gly Leu Gly Pro Leu Met Ser Tyr Leu Arg Phe
050 055 060
Ile Trp Thr Gly Ile Gly Thr Ala Ser Asn Tyr Tyr Asn Asn Lys
065 070 075
Tyr Gly Asp Ile Val Arg Val Trp Ile Asn Gly Glu Glu Thr Leu
080 085 090
Ile Leu Ser Arg Ala Ser Ala Val His His Val Leu Lys Asn Arg
095 100 105
Lys Tyr Thr Ser Arg Phe Gly Ser Lys Gln Gly Leu Ser Cys Ile
110 115 120
Gly Met Asn Glu Lys Gly Ile Ile Phe Asn Asn Asn Val Ala Leu
125 130 135
Trp Lys Lys Ile Arg Thr Tyr Phe Thr Lys Ala Leu Thr Gly Pro
140 145 150
Asn Leu Gln Gln Thr Val Glu Val Cys Val Thr Ser Thr Gln Thr
155 160 165
His Leu Asp Asn Leu Ser Ser Leu Ser Tyr Val Asp Val Leu Gly
170 175 180
Phe Leu Arg Cys Thr Val Val Asp Ile Ser Asn Arg Leu Phe Leu
185 190 195
Gly Val Pro Val Asp Glu Lys Glu Leu Leu Gln Lys Ile His Lys
200 205 210
Tyr Phe Asp Thr Trp Gln Thr Val Leu Ile Lys Pro Asp Ile Tyr
215 220 225
Phe Lys Phe Ser Trp Ile His Gln Arg His Lys Thr Ala Ala Gln
230 235 240
Glu Leu Gln Asp Ala Ile Glu Ser Leu Val Glu Arg Lys Arg Lys
245 250 255
Glu Met Glu Gln Ala Glu Lys Leu Asp Asn Ile Asn Phe Thr Ala
260 265 270
Glu Leu Ile Phe Ala Gln Gly His Gly Glu Leu Ser Ala Glu Asn
275 280 285
Val Arg Gln Cys Val Leu Glu Met Val Ile Ala Ala Pro Asp Thr
290 295 300
Leu Ser Ile Ser Leu Phe Phe Met Leu Leu Leu Lys Gln Asn
305 310 315
Pro His Val Glu Leu Gln Leu Leu Gln Glu Ile Asp Thr Ile Val
320 325 330
Gly Asp Ser Gln Leu Gln Asn Gln Asp Leu Gln Lys Leu Gln Val
335 340 345
Leu Glu Ser Phe Ile Asn Glu Cys Leu Arg Phe His Pro Val Val
350 355 360
Asp Phe Thr Met Arg Arg Ala Leu Phe Asp Asp Ile Ile Asp Gly
365 370 375

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Arg | Val | Gln | Lys | Gly | Thr | Asn | Ile | Ile | Leu | Asn | Thr | Gly | Arg |
| | | | | | | | | | 380 | | 385 | | | 390 |
| Met | His | Arg | Thr | Glu | Phe | Phe | His | Lys | Ala | Asn | Glu | Phe | Ser | Leu |
| | | | | | | | | | 395 | | 400 | | | 405 |
| Glu | Asn | Phe | Gln | Lys | Asn | Thr | Pro | Arg | Arg | Tyr | Phe | Gln | Pro | Phe |
| | | | | | | | | | 410 | | 415 | | | 420 |
| Gly | Ser | Gly | Pro | Arg | Ala | Cys | Val | Gly | Arg | His | Ile | Ala | Met | Val |
| | | | | | | | | | 425 | | 430 | | | 435 |
| Met | Met | Lys | Ser | Ile | Leu | Val | Thr | Leu | Leu | Ser | Gln | Tyr | Ser | Val |
| | | | | | | | | | 440 | | 445 | | | 450 |
| Cys | Pro | His | Glu | Gly | Leu | Thr | Leu | Asp | Cys | Leu | Pro | Gln | Thr | Asn |
| | | | | | | | | | 455 | | 460 | | | 465 |
| Asn | Leu | Ser | Gln | Gln | Pro | Val | Glu | His | His | Gln | | | | |
| | | | | | | | | | 470 | | 475 | | | |

<210> 9
 <211> 484
 <212> PRT
 <213> Sus scrofa (pig) ovary

| | | | | | | | | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <400> 9 | | | | | | | | | | | | | | |
| Met | Val | Leu | Glu | Met | Leu | Asn | Pro | Met | Asn | Ile | Ser | Ser | Met | Val |
| | | | | | | | | | 005 | | 010 | | | 015 |
| Ser | Glu | Ala | Val | Leu | Phe | Gly | Ser | Ile | Ala | Ile | Leu | Leu | Ile | |
| | | | | | | | | | 020 | | 025 | | | 030 |
| Gly | Leu | Leu | Leu | Trp | Val | Trp | Asn | Tyr | Glu | Asp | Thr | Ser | Ser | Ile |
| | | | | | | | | | 035 | | 040 | | | 045 |
| Pro | Gly | Pro | Gly | Tyr | Phe | Leu | Gly | Ile | Gly | Pro | Leu | Ile | Ser | His |
| | | | | | | | | | 050 | | 055 | | | 060 |
| Phe | Arg | Phe | Leu | Trp | Met | Gly | Ile | Gly | Ser | Ala | Cys | Asn | Tyr | Tyr |
| | | | | | | | | | 065 | | 070 | | | 075 |
| Asn | Lys | Met | Tyr | Gly | Glu | Phe | Met | Arg | Val | Trp | Ile | Gly | Gly | Glu |
| | | | | | | | | | 080 | | 085 | | | 090 |
| Glu | Thr | Leu | Ile | Ile | Ser | Lys | Ser | Ser | Ser | Ile | Phe | His | Ile | Met |
| | | | | | | | | | 095 | | 100 | | | 105 |
| Lys | His | Asn | His | Tyr | Thr | Cys | Arg | Phe | Gly | Ser | Lys | Leu | Gly | Leu |
| | | | | | | | | | 110 | | 115 | | | 120 |
| Glu | Cys | Ile | Gly | Met | His | Glu | Lys | Gly | Ile | Met | Phe | Asn | Asn | Asn |
| | | | | | | | | | 125 | | 130 | | | 135 |
| Pro | Ala | Leu | Trp | Lys | Ala | Val | Arg | Pro | Phe | Phe | Thr | Lys | Ala | Leu |
| | | | | | | | | | 140 | | 145 | | | 150 |
| Ser | Gly | Pro | Gly | Leu | Val | Arg | Met | Val | Thr | Val | Cys | Ala | Asp | Ser |
| | | | | | | | | | 155 | | 160 | | | 165 |
| Ile | Thr | Lys | His | Leu | Asp | Lys | Leu | Glu | Glu | Val | Arg | Asn | Asp | Leu |
| | | | | | | | | | 170 | | 175 | | | 180 |
| Gly | Tyr | Val | Asp | Val | Leu | Thr | Leu | Met | Arg | Arg | Ile | Met | Leu | Asp |
| | | | | | | | | | 185 | | 190 | | | 195 |
| Thr | Ser | Asn | Asn | Leu | Phe | Leu | Gly | Ile | Pro | Leu | Asp | Glu | Ser | Ala |

| | | |
|---|-----|-----|
| 200 | 205 | 210 |
| Leu Val His Lys Val Gln Gly Tyr Phe Asp Ala Trp Gln Ala Leu | | |
| 215 | 220 | 225 |
| Leu Leu Lys Pro Asp Ile Phe Phe Lys Ile Ser Trp Leu Tyr Arg | | |
| 230 | 235 | 240 |
| Lys Tyr Glu Lys Ser Val Lys Asp Leu Lys Asp Ala Met Glu Ile | | |
| 245 | 250 | 255 |
| Leu Ile Glu Glu Lys Arg His Arg Ile Ser Thr Ala Glu Lys Leu | | |
| 260 | 265 | 270 |
| Glu Asp Ser Met Asp Phe Thr Thr Gln Leu Ile Phe Ala Glu Lys | | |
| 275 | 280 | 285 |
| Arg Gly Glu Leu Thr Lys Glu Asn Val Asn Gln Cys Val Leu Glu | | |
| 290 | 295 | 300 |
| Met Met Ile Ala Ala Pro Asp Thr Met Ser Ile Thr Val Phe Phe | | |
| 305 | 310 | 315 |
| Met Leu Phe Leu Ile Ala Asn His Pro Gln Val Glu Glu Glu Leu | | |
| 320 | 325 | 330 |
| Met Lys Glu Ile Tyr Thr Val Val Gly Glu Arg Asp Ile Arg Asn | | |
| 335 | 340 | 345 |
| Asp Asp Met Gln Lys Leu Lys Val Val Glu Asn Phe Ile Tyr Glu | | |
| 350 | 355 | 360 |
| Ser Met Arg Tyr Gln Pro Val Val Asp Phe Val Met Arg Lys Ala | | |
| 365 | 370 | 375 |
| Leu Glu Asp Asp Val Ile Asp Gly Tyr Pro Val Lys Lys Gly Thr | | |
| 380 | 385 | 390 |
| Asn Ile Ile Leu Asn Ile Gly Arg Met His Arg Leu Glu Phe Phe | | |
| 395 | 400 | 405 |
| Pro Lys Pro Asn Glu Phe Thr Leu Glu Asn Phe Ala Lys Asn Val | | |
| 410 | 415 | 420 |
| Pro Tyr Arg Tyr Phe Gln Pro Phe Gly Phe Gly Pro Arg Ala Cys | | |
| 425 | 430 | 435 |
| Ala Gly Lys Tyr Ile Ala Met Val Met Met Lys Val Ile Leu Val | | |
| 440 | 445 | 450 |
| Thr Leu Leu Arg Arg Phe Gln Val Gln Thr Gln Gln Gly Gln Cys | | |
| 455 | 460 | 465 |
| Val Glu Lys Met Gln Lys Lys Asn Asp Leu Ser Leu His Pro His | | |
| 470 | 475 | 480 |
| Glu Thr Ser Gly | | |

<210> 10

<211> 486

<212> PRT

<213> Bos taurus

<400> 10

| | | |
|---|-----|-----|
| Met Val Leu Glu Met Leu Asn Pro Met His Phe Asn Ile Thr Thr | | |
| 005 | 010 | 015 |

Met Val Pro Ala Ala Met Pro Ala Ala Thr Met Pro Ile Leu Leu

| | | |
|-------------------------------------|-------------------------|-----|
| 020 | 025 | 030 |
| Leu Thr Cys Leu Leu Leu Ile Trp Asn | Tyr Glu Gly Thr Ser | |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Gly Tyr Cys Met | Gly Ile Gly Pro Leu Ile | |
| 050 | 055 | 060 |
| Ser Tyr Ala Arg Phe Leu Trp Met Gly | Ile Gly Ser Ala Cys Asn | |
| 065 | 070 | 075 |
| Tyr Tyr Asn Lys Met Tyr Gly Glu Phe | Ile Arg Val Trp Ile Cys | |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu Ile Ile Ser Lys | Ser Ser Ser Met Phe His | |
| 095 | 100 | 105 |
| Val Met Lys His Ser His Tyr Val Ser | Arg Phe Gly Ser Lys Pro | |
| 110 | 115 | 120 |
| Gly Leu Gln Cys Ile Gly Met His Glu | Asn Gly Ile Ile Phe Asn | |
| 125 | 130 | 135 |
| Asn Asn Pro Ala Leu Trp Lys Val Val | Arg Pro Phe Phe Met Lys | |
| 140 | 145 | 150 |
| Ala Leu Thr Gly Pro Gly Leu Val Gln | Met Val Ala Ile Cys Val | |
| 155 | 160 | 165 |
| Gly Ser Ile Gly Arg His Leu Asp Lys | Leu Glu Glu Val Thr Thr | |
| 170 | 175 | 180 |
| Arg Ser Gly Cys Val Asp Val Leu Thr | Leu Met Arg Arg Ile Met | |
| 185 | 190 | 195 |
| Leu Asp Thr Ser Asn Thr Leu Phe Leu | Gly Ile Pro Met Asp Glu | |
| 200 | 205 | 210 |
| Ser Ala Ile Val Val Lys Ile Gln Gly | Tyr Phe Asp Ala Trp Gln | |
| 215 | 220 | 225 |
| Ala Leu Leu Leu Lys Pro Asn Ile Phe | Phe Lys Ile Ser Trp Leu | |
| 230 | 235 | 240 |
| Tyr Lys Lys Tyr Glu Lys Ser Val Lys | Asp Leu Lys Asp Ala Ile | |
| 245 | 250 | 255 |
| Asp Ile Leu Val Glu Lys Lys Arg Arg | Arg Ile Ser Thr Ala Glu | |
| 260 | 265 | 270 |
| Lys Leu Glu Asp His Met Asp Phe Ala | Thr Asn Leu Ile Phe Ala | |
| 275 | 280 | 285 |
| Glu Lys Arg Gly Asp Leu Thr Arg Glu | Asn Val Asn Gln Cys Val | |
| 290 | 295 | 300 |
| Leu Glu Met Leu Ile Ala Ala Pro Asp | Thr Met Ser Val Ser Val | |
| 305 | 310 | 315 |
| Phe Phe Met Leu Phe Leu Ile Ala Lys | His Pro Ser Val Glu Glu | |
| 320 | 325 | 330 |
| Ala Ile Met Glu Glu Ile Gln Thr Val | Val Gly Glu Arg Asp Ile | |
| 335 | 340 | 345 |
| Arg Ile Asp Asp Ile Gln Lys Leu Lys | Val Val Glu Asn Phe Ile | |
| 350 | 355 | 360 |
| Tyr Glu Ser Met Arg Tyr Gln Pro Val | Val Asp Leu Val Met Arg | |
| 365 | 370 | 375 |
| Lys Ala Leu Glu Asp Asp Val Ile Asp | Gly Tyr Pro Val Lys Lys | |

| 380 | 385 | 390 |
|-------------------------------------|-------------------------|-----|
| Gly Thr Asn Ile Ile Leu Asn Ile Gly | Arg Met His Arg Leu Glu | |
| 395 | 400 | 405 |
| Phe Phe Pro Lys Pro Asn Glu Phe Thr | Leu Glu Asn Phe Ala Lys | |
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro | Phe Gly Phe Gly Pro Arg | |
| 425 | 430 | 435 |
| Gly Cys Ala Gly Lys Tyr Ile Ala Met | Val Met Met Lys Val Ile | |
| 440 | 445 | 450 |
| Leu Val Thr Leu Leu Arg Arg Phe Gln | Val Lys Ala Leu Gln Gly | |
| 455 | 460 | 465 |
| Arg Ser Val Glu Asn Ile Gln Lys Lys | Asn Asp Leu Ser Leu His | |
| 470 | 475 | 480 |
| Pro Asp Glu Thr Ser Asp | | |
| 485 | | |

<210> 11

<211> 485

<212> PRT

<213> Equus caballus

<400> 11

| | | |
|---|---------------------|-----|
| Val Met Glu Ile Leu Leu Arg Glu Ala Arg Asn Gly Thr Asp Pro | | |
| 005 | 010 | 015 |
| Arg Tyr Glu Asn Pro Arg Gly Ile Thr | Leu Leu Leu Leu Cys | |
| 020 | 025 | 030 |
| Leu Val Leu Leu Leu Thr Val Trp Asn Arg His Glu Lys Lys Cys | | |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Ser Phe Cys Leu Gly Leu Gly Pro Leu Met | | |
| 050 | 055 | 060 |
| Ser Tyr Cys Arg Phe Ile Trp Met Gly Ile Gly Thr Ala Ser Asn | | |
| 065 | 070 | 075 |
| Tyr Tyr Asn Glu Lys Tyr Gly Asp Met Val Arg Val Trp Ile Ser | | |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu Val Leu Ser Arg Pro Ser Ala Val Tyr His | | |
| 095 | 100 | 105 |
| Val Leu Lys His Ser Gln Tyr Thr Ser Arg Phe Gly Ser Lys Leu | | |
| 110 | 115 | 120 |
| Gly Leu Gln Cys Ile Gly Met His Glu Gln Gly Ile Ile Phe Asn | | |
| 125 | 130 | 135 |
| Ser Asn Val Thr Leu Trp Arg Lys Val Arg Thr Tyr Phe Ala Lys | | |
| 140 | 145 | 150 |
| Ala Leu Thr Gly Pro Gly Leu Gln Arg Thr Leu Glu Ile Cys Thr | | |
| 155 | 160 | 165 |
| Met Ser Thr Asn Thr His Leu Asp Gly Leu Ser Arg Leu Thr Asp | | |
| 170 | 175 | 180 |
| Ala Gln Gly His Val Asp Val Leu Asn Leu Leu Arg Cys Ile Val | | |
| 185 | 190 | 195 |

Val Asp Ile Ser Asn Arg Leu Phe Leu Asp Val Pro Leu Asn Glu
200 205 210
Gln Asn Leu Leu Phe Lys Ile His Arg Tyr Phe Glu Thr Trp Gln
215 220 225
Thr Val Leu Ile Lys Pro Asp Phe Tyr Phe Arg Leu Lys Trp Leu
230 235 240
His Asp Lys His Arg Asn Ala Ala Gln Glu Leu His Asp Ala Ile
245 250 255
Glu Asp Leu Ile Glu Gln Lys Arg Thr Glu Leu Gln Gln Ala Glu
260 265 270
Lys Leu Asp Asn Leu Asn Phe Thr Glu Glu Leu Ile Phe Ala Gln
275 280 285
Ser His Gly Glu Leu Thr Ala Glu Asn Val Arg Gln Cys Val Leu
290 295 300
Glu Met Val Ile Ala Ala Pro Asp Thr Leu Ser Ile Ser Val Phe
305 310 315
Phe Met Leu Leu Leu Lys Gln Asn Ala Glu Val Glu Arg Arg
320 325 330
Ile Leu Thr Glu Ile His Thr Val Leu Gly Asp Thr Glu Leu Gln
335 340 345
His Ser His Leu Ser Gln Leu His Val Leu Glu Cys Phe Ile Asn
350 355 360
Glu Ala Leu Arg Phe His Pro Val Val Asp Phe Ser Tyr Arg Arg
365 370 375
Ala Leu Asp Asp Asp Val Ile Glu Gly Phe Arg Val Pro Arg Gly
380 385 390
Thr Asn Ile Ile Leu Asn Val Gly Arg Met His Arg Ser Glu Phe
395 400 405
Tyr Pro Lys Pro Ala Asp Phe Ser Leu Asp Asn Phe Asn Lys Pro
410 415 420
Val Pro Ser Arg Phe Phe Gln Pro Phe Gly Ser Gly Pro Arg Ser
425 430 435
Cys Val Gly Lys His Ile Ala Met Val Met Met Lys Ala Val Leu
440 445 450
Leu Met Val Leu Ser Arg Phe Ser Val Cys Pro Glu Glu Ser Cys
455 460 465
Thr Val Glu Asn Ile Ala His Thr Asn Asp Leu Ser Gln Gln Pro
470 475 480
Val Glu Asp Lys His
485

<210> 12
<211> 486
<212> PRT
<213> Mus musculus

<400> 12
Met Val Leu Glu Thr Leu Asn Pro Leu His Tyr Asn Ile Thr Ser

| | | |
|-------------------------------------|-------------------------|-----|
| 005 | 010 | 015 |
| Leu Val Pro Asp Thr Met Pro Val Ala | Thr Val Pro Ile Leu Ile | |
| 020 | 025 | 030 |
| Leu Met Cys Phe Leu Phe Leu Ile Trp | Asn His Glu Glu Thr Ser | |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Gly Tyr Cys Met | Gly Ile Gly Pro Leu Ile | |
| 050 | 055 | 060 |
| Ser His Gly Arg Phe Leu Trp Met Gly | Val Gly Asn Ala Cys Asn | |
| 065 | 070 | 075 |
| Tyr Tyr Asn Lys Thr Tyr Gly Asp Phe | Val Arg Val Trp Ile Ser | |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Phe Ile Ile Ser Lys | Ser Ser Ser Val Ser His | |
| 095 | 100 | 105 |
| Val Met Lys His Trp His Tyr Val Ser | Arg Phe Gly Ser Lys Leu | |
| 110 | 115 | 120 |
| Gly Leu Gln Cys Ile Gly Met Tyr Glu | Asn Gly Ile Ile Phe Asn | |
| 125 | 130 | 135 |
| Asn Asn Pro Ala His Trp Lys Glu Ile | Arg Pro Phe Phe Thr Lys | |
| 140 | 145 | 150 |
| Ala Leu Ser Gly Pro Gly Leu Val Arg | Met Ile Ala Ile Cys Val | |
| 155 | 160 | 165 |
| Glu Ser Thr Thr Glu His Leu Asp Arg | Leu Gln Glu Val Thr Thr | |
| 170 | 175 | 180 |
| Glu Leu Gly Asn Ile Asn Ala Leu Asn | Leu Met Arg Arg Ile Met | |
| 185 | 190 | 195 |
| Leu Asp Thr Ser Asn Lys Leu Phe Leu | Gly Val Pro Leu Asp Glu | |
| 200 | 205 | 210 |
| Asn Ala Ile Val Leu Lys Ile Gln Asn | Tyr Phe Asp Ala Trp Gln | |
| 215 | 220 | 225 |
| Ala Leu Leu Leu Lys Pro Asp Ile Phe | Phe Lys Ile Ser Trp Leu | |
| 230 | 235 | 240 |
| Cys Lys Lys Tyr Lys Asp Ala Val Lys | Asp Leu Lys Gly Ala Met | |
| 245 | 250 | 255 |
| Glu Ile Leu Ile Glu Gln Lys Arg Gln | Lys Leu Ser Thr Val Glu | |
| 260 | 265 | 270 |
| Lys Leu Asp Glu His Met Asp Phe Ala | Ser Gln Leu Ile Phe Ala | |
| 275 | 280 | 285 |
| Gln Asn Arg Gly Asp Leu Thr Ala Glu | Asn Val Asn Gln Cys Val | |
| 290 | 295 | 300 |
| Leu Glu Met Met Ile Ala Ala Pro Asp | Thr Leu Ser Val Thr Leu | |
| 305 | 310 | 315 |
| Phe Phe Met Leu Ile Leu Ile Ala Glu | His Pro Thr Val Glu Glu | |
| 320 | 325 | 330 |
| Glu Met Met Arg Glu Ile Glu Thr Val | Val Gly Asp Arg Asp Ile | |
| 335 | 340 | 345 |
| Gln Ser Asp Asp Met Pro Asn Leu Lys | Ile Val Glu Asn Phe Ile | |
| 350 | 355 | 360 |
| Tyr Glu Ser Met Arg Tyr Gln Pro Val | Val Asp Leu Ile Met Arg | |

| | | |
|-------------------------------------|-------------------------|-----|
| 365 | 370 | 375 |
| Lys Ala Leu Gln Asp Asp Val Ile Asp | Gly Tyr Pro Val Lys Lys | |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile Leu Asn Ile Gly | Arg Met His Lys Leu Glu | |
| 395 | 400 | 405 |
| Phe Phe Pro Lys Pro Asn Glu Phe Ser | Leu Glu Asn Phe Glu Lys | |
| 410 | 415 | 420 |
| Asn Val Pro Ser Arg Tyr Phe Gln Pro | Phe Gly Phe Gly Pro Arg | |
| 425 | 430 | 435 |
| Ser Cys Val Gly Lys Phe Ile Ala Met | Val Met Met Lys Ala Ile | |
| 440 | 445 | 450 |
| Leu Val Thr Leu Leu Arg Arg Cys Arg | Val Gln Thr Met Lys Gly | |
| 455 | 460 | 465 |
| Arg Gly Leu Asn Asn Ile Gln Lys Asn | Asn Asp Leu Ser Met His | |
| 470 | 475 | 480 |
| Pro Ile Glu Arg Gln Pro | | |
| 485 | | |

<210> 13
 <211> 478
 <212> PRT
 <213> Rattus norvegicus

| | | |
|---|-----|-----|
| <400> 13 | | |
| Val Val Ala Arg Ser Leu Cys Asp Leu Lys Cys His Pro Ile Asp | | |
| 005 | 010 | 015 |
| Gly Ile Ser Met Ala Thr Arg Thr Leu Ile Leu Leu Val Cys Leu | | |
| 020 | 025 | 030 |
| Leu Leu Val Ala Trp Ser His Thr Asp Lys Lys Ile Val Pro Gly | | |
| 035 | 040 | 045 |
| Pro Ser Phe Cys Leu Gly Leu Gly Pro Leu Leu Ser Tyr Leu Arg | | |
| 050 | 055 | 060 |
| Phe Ile Trp Thr Gly Ile Gly Thr Ala Ser Asn Tyr Tyr Asn Asn | | |
| 065 | 070 | 075 |
| Lys Tyr Gly Asp Ile Val Arg Val Trp Ile Asn Gly Glu Glu Thr | | |
| 080 | 085 | 090 |
| Leu Ile Leu Ser Arg Ser Ser Ala Val His His Val Leu Lys Asn | | |
| 095 | 100 | 105 |
| Gly Asn Tyr Thr Ser Arg Phe Gly Ser Ile Gln Gly Leu Ser Tyr | | |
| 110 | 115 | 120 |
| Leu Gly Met Asn Glu Arg Gly Ile Ile Phe Asn Asn Asn Val Thr | | |
| 125 | 130 | 135 |
| Leu Trp Lys Lys Ile Arg Thr Tyr Phe Ala Lys Ala Leu Thr Gly | | |
| 140 | 145 | 150 |
| Pro Asn Leu Gln Gln Thr Val Asp Val Cys Val Ser Ser Ile Gln | | |
| 155 | 160 | 165 |
| Ala His Leu Asp His Leu Asp Ser Leu Gly His Val Asp Val Leu | | |
| 170 | 175 | 180 |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Leu | Leu | Arg | Cys | Thr | Val | Leu | Asp | Ile | Ser | Asn | Arg | Leu | Phe |
| | | | | | 185 | | | | 190 | | | | | 195 |
| Leu | Asn | Val | Pro | Leu | Asn | Glu | Lys | Glu | Leu | Met | Leu | Lys | Ile | Gln |
| | | | | | 200 | | | | 205 | | | | | 210 |
| Lys | Tyr | Phe | His | Thr | Trp | Gln | Asp | Val | Leu | Ile | Lys | Pro | Asp | Ile |
| | | | | | 215 | | | | 220 | | | | | 225 |
| Tyr | Phe | Lys | Phe | Arg | Trp | Ile | His | His | Arg | His | Lys | Thr | Ala | Thr |
| | | | | | 230 | | | | 235 | | | | | 240 |
| Gln | Glu | Leu | Gln | Asp | Ala | Ile | Lys | Arg | Leu | Val | Asp | Gln | Lys | Arg |
| | | | | | 245 | | | | 250 | | | | | 255 |
| Lys | Asn | Met | Glu | Gln | Ala | Asp | Lys | Leu | Asp | Asn | Ile | Asn | Phe | Thr |
| | | | | | 260 | | | | 265 | | | | | 270 |
| Ala | Glu | Leu | Ile | Phe | Ala | Gln | Asn | His | Gly | Glu | Leu | Ser | Ala | Glu |
| | | | | | 275 | | | | 280 | | | | | 285 |
| Asn | Val | Thr | Gln | Cys | Val | Leu | Glu | Met | Val | Ile | Ala | Ala | Pro | Asp |
| | | | | | 290 | | | | 295 | | | | | 300 |
| Thr | Leu | Ser | Leu | Ser | Leu | Phe | Phe | Met | Leu | Leu | Leu | Lys | Gln | |
| | | | | | 305 | | | | 310 | | | | | 315 |
| Asn | Pro | His | Val | Glu | Pro | Gln | Leu | Leu | Gln | Glu | Ile | Asp | Ala | Val |
| | | | | | 320 | | | | 325 | | | | | 330 |
| Val | Gly | Glu | Arg | Gln | Leu | Gln | Asn | Gln | Asp | Leu | His | Lys | Leu | Gln |
| | | | | | 335 | | | | 340 | | | | | 345 |
| Val | Met | Glu | Ser | Phe | Ile | Tyr | Glu | Cys | Leu | Ser | Phe | His | Pro | Val |
| | | | | | 350 | | | | 355 | | | | | 360 |
| Val | Asp | Phe | Thr | Met | Arg | Arg | Ala | Leu | Ser | Asp | Asp | Ile | Ile | Glu |
| | | | | | 365 | | | | 370 | | | | | 375 |
| Gly | Tyr | Arg | Ile | Ser | Lys | Gly | Thr | Asn | Ile | Ile | Leu | Asn | Thr | Gly |
| | | | | | 380 | | | | 385 | | | | | 390 |
| Arg | Met | His | Arg | Thr | Glu | Phe | Phe | Leu | Lys | Gly | Asn | Gln | Phe | Asn |
| | | | | | 395 | | | | 400 | | | | | 405 |
| Leu | Glu | His | Phe | Glu | Asn | Asn | Val | Pro | Arg | Pro | Pro | Thr | Phe | Gln |
| | | | | | 410 | | | | 415 | | | | | 420 |
| Pro | Phe | Gly | Ser | Gly | Pro | Arg | Ala | Cys | Ile | Gly | Lys | His | Met | Ala |
| | | | | | 425 | | | | 430 | | | | | 435 |
| Met | Val | Met | Met | Lys | Ser | Ile | Leu | Val | Thr | Leu | Leu | Ser | Gln | Tyr |
| | | | | | 440 | | | | 445 | | | | | 450 |
| Ser | Val | Cys | Thr | His | Glu | Gly | Pro | Ile | Leu | Asp | Cys | Leu | Pro | Gln |
| | | | | | 455 | | | | 460 | | | | | 465 |
| Thr | Asn | Asn | Leu | Ser | Gln | Gln | Pro | Val | Glu | His | Gln | Gln | | |
| | | | | | 470 | | | | 475 | | | | | |

<210> 14
 <211> 478
 <212> PRT
 <213> Oryctolagus cuniculus

<400> 14
 Met Leu Leu Glu Val Leu Asn Pro Arg His Tyr Asn Val Thr Ser

| 005 | 010 | 015 |
|---|-----------------|-----|
| Met Val Ser Glu Val Val Pro Ile Ala Ser | Ile Ala Ile Leu | Leu |
| 020 | 025 | 030 |
| Leu Thr Gly Phe Leu Leu Leu Val Trp Asn | Tyr Glu Asp Thr | Ser |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Ser Tyr Phe Leu Gly | Ile Gly Pro Leu | Ile |
| 050 | 055 | 060 |
| Ser His Cys Arg Phe Leu Trp Met Gly Ile | Gly Ser Ala Cys | Asn |
| 065 | 070 | 075 |
| Tyr Tyr Asn Lys Met Tyr Gly Glu Phe Met | Arg Val Trp Val | Cys |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu Ile Ile Ser Lys Ser | Ser Ser Met Phe | His |
| 095 | 100 | 105 |
| Val Met Lys His Ser His Tyr Ile Ser Arg | Phe Gly Ser Lys | Leu |
| 110 | 115 | 120 |
| Gly Leu Gln Phe Ile Gly Met His Glu Lys | Gly Ile Ile Phe | Asn |
| 125 | 130 | 135 |
| Asn Asn Pro Ala Leu Trp Lys Ala Val Arg | Pro Phe Phe Thr | Lys |
| 140 | 145 | 150 |
| Ala Leu Ser Gly Pro Gly Leu Val Arg Met | Val Thr Ile Cys | Ala |
| 155 | 160 | 165 |
| Asp Ser Ile Thr Lys His Leu Asp Arg Leu | Glu Glu Val Cys | Asn |
| 170 | 175 | 180 |
| Asp Leu Gly Tyr Val Asp Val Leu Thr Leu | Met Arg Arg Ile | Met |
| 185 | 190 | 195 |
| Leu Asp Thr Ser Asn Met Leu Phe Leu Gly | Ile Pro Leu Asp | Glu |
| 200 | 205 | 210 |
| Ser Ala Ile Val Val Asn Ile Gln Gly Tyr | Phe Asp Ala Trp | Gln |
| 215 | 220 | 225 |
| Ala Leu Leu Leu Lys Pro Asp Ile Phe Phe | Lys Ile Ser Trp | Leu |
| 230 | 235 | 240 |
| Cys Arg Lys Tyr Glu Lys Ser Val Lys Asp | Leu Lys Asp Ala | Met |
| 245 | 250 | 255 |
| Glu Ile Leu Ile Ala Glu Lys Arg His Arg | Ile Ser Thr Ala | Glu |
| 260 | 265 | 270 |
| Lys Leu Glu Asp Ser Ile Asp Phe Ala Thr | Glu Leu Ile Phe | Ala |
| 275 | 280 | 285 |
| Glu Lys Arg Gly Glu Leu Thr Arg Glu Asn | Val Asn Gln Cys | Ile |
| 290 | 295 | 300 |
| Leu Glu Met Leu Ile Ala Ala Pro Asp Thr | Met Ser Val Ser | Val |
| 305 | 310 | 315 |
| Phe Phe Met Leu Phe Leu Ile Ala Lys His | Pro Gln Val Glu | Glu |
| 320 | 325 | 330 |
| Ala Ile Ile Arg Glu Ile Gln Thr Val Val | Gly Glu Arg Asp | Ile |
| 335 | 340 | 345 |
| Arg Ile Asp Asp Met Gln Lys Leu Lys Val | Val Glu Asn Phe | Ile |
| 350 | 355 | 360 |
| Asn Glu Ser Met Arg Tyr Gln Pro Val Val | Asp Leu Val Met | Arg |

| | | |
|-------------------------------------|-------------------------|-----|
| 365 | 370 | 375 |
| Lys Ala Leu Glu Asp Asp Val Ile Asp | Gly Tyr Pro Val Lys Lys | |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile Leu Asn Leu Gly | Arg Met His Arg Leu Glu | |
| 395 | 400 | 405 |
| Phe Phe Pro Lys Pro Asn Glu Phe Thr | Leu Glu Asn Phe Ala Lys | |
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro | Phe Gly Phe Gly Pro Arg | |
| 425 | 430 | 435 |
| Gly Cys Ala Gly Lys Tyr Ile Ala Met | Val Met Met Lys Val Val | |
| 440 | 445 | 450 |
| Leu Val Thr Leu Leu Arg Arg Phe His | Val Gln Thr Leu Gln Gly | |
| 455 | 460 | 465 |
| Arg Cys Val Glu Lys Met Gln Lys Lys | Asn Asp Leu Ser Leu His | |
| 470 | 475 | 480 |
| Pro Asp Glu Thr Arg Asp | | |
| 485 | | |

<210> 15
<211> 486
<212> PRT
<213> Homo sapiens

| | | |
|---|-----|-----|
| <400> 15 | | |
| Met Val Leu Glu Met Leu Asn Pro Ile His Tyr Asn Ile Thr Ser | | |
| 005 | 010 | 015 |
| Ile Val Pro Glu Ala Met Pro Ala Ala Thr Met Pro Val Leu Leu | | |
| 020 | 025 | 030 |
| Leu Thr Gly Leu Phe Leu Leu Val Trp Asn Tyr Glu Gly Thr Ser | | |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Gly Tyr Cys Met Gly Ile Gly Pro Leu Ile | | |
| 050 | 055 | 060 |
| Ser His Gly Arg Phe Leu Trp Met Gly Ile Gly Ser Ala Cys Asn | | |
| 065 | 070 | 075 |
| Tyr Tyr Asn Arg Val Tyr Gly Glu Phe Met Arg Val Trp Ile Ser | | |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu Ile Ile Ser Lys Ser Ser Ser Met Phe His | | |
| 095 | 100 | 105 |
| Ile Met Lys His Asn His Tyr Ser Ser Arg Phe Gly Ser Lys Leu | | |
| 110 | 115 | 120 |
| Gly Leu Gln Cys Ile Gly Met His Glu Lys Gly Ile Ile Phe Asn | | |
| 125 | 130 | 135 |
| Asn Asn Pro Glu Leu Trp Lys Thr Thr Arg Pro Phe Phe Met Lys | | |
| 140 | 145 | 150 |
| Ala Leu Ser Gly Pro Gly Leu Val Arg Met Val Thr Val Cys Ala | | |
| 155 | 160 | 165 |
| Glu Ser Leu Lys Thr His Leu Asp Arg Leu Glu Glu Val Thr Asn | | |
| 170 | 175 | 180 |

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Ser | Gly | Tyr | Val | Asp | Val | Leu | Thr | Leu | Leu | Arg | Arg | Val | Met |
| | | | | 185 | | | | | 190 | | | | 195 | |
| Leu | Asp | Thr | Ser | Asn | Thr | Leu | Phe | Leu | Arg | Ile | Pro | Leu | Asp | Glu |
| | | | | 200 | | | | | 205 | | | | 210 | |
| Ser | Ala | Ile | Val | Val | Lys | Ile | Gln | Gly | Tyr | Phe | Asp | Ala | Trp | Gln |
| | | | | 215 | | | | | 220 | | | | 225 | |
| Ala | Leu | Leu | Ile | Lys | Pro | Asp | Ile | Phe | Phe | Lys | Ile | Ser | Trp | Leu |
| | | | | 230 | | | | | 235 | | | | 240 | |
| Tyr | Lys | Lys | Tyr | Glu | Lys | Ser | Val | Lys | Asp | Leu | Lys | Asp | Ala | Ile |
| | | | | 245 | | | | | 250 | | | | 255 | |
| Glu | Val | Leu | Ile | Ala | Glu | Lys | Arg | Arg | Arg | Ile | Ser | Thr | Glu | Glu |
| | | | | 260 | | | | | 265 | | | | 270 | |
| Lys | Leu | Glu | Glu | Cys | Met | Asp | Phe | Ala | Thr | Glu | Leu | Ile | Leu | Ala |
| | | | | 275 | | | | | 280 | | | | 285 | |
| Glu | Lys | Arg | Gly | Asp | Leu | Thr | Arg | Glu | Asn | Val | Asn | Gln | Cys | Ile |
| | | | | 290 | | | | | 295 | | | | 300 | |
| Leu | Glu | Met | Leu | Ile | Ala | Ala | Pro | Asp | Thr | Met | Ser | Val | Ser | Leu |
| | | | | 305 | | | | | 310 | | | | 315 | |
| Phe | Phe | Met | Leu | Phe | Leu | Ile | Ala | Lys | His | Pro | Asn | Val | Glu | Glu |
| | | | | 320 | | | | | 325 | | | | 330 | |
| Ala | Ile | Ile | Lys | Glu | Ile | Gln | Thr | Val | Ile | Gly | Glu | Arg | Asp | Ile |
| | | | | 335 | | | | | 340 | | | | 345 | |
| Lys | Ile | Asp | Asp | Ile | Gln | Lys | Leu | Lys | Val | Met | Glu | Asn | Phe | Ile |
| | | | | 350 | | | | | 355 | | | | 360 | |
| Tyr | Glu | Ser | Met | Arg | Tyr | Gln | Pro | Val | Val | Asp | Leu | Val | Met | Arg |
| | | | | 365 | | | | | 370 | | | | 375 | |
| Lys | Ala | Leu | Glu | Asp | Asp | Val | Ile | Asp | Gly | Tyr | Pro | Val | Lys | Lys |
| | | | | 380 | | | | | 385 | | | | 390 | |
| Gly | Thr | Asn | Ile | Ile | Leu | Asn | Ile | Gly | Arg | Met | His | Arg | Leu | Glu |
| | | | | 395 | | | | | 400 | | | | 405 | |
| Phe | Phe | Pro | Lys | Pro | Asn | Glu | Phe | Thr | Leu | Glu | Asn | Phe | Ala | Lys |
| | | | | 410 | | | | | 415 | | | | 420 | |
| Asn | Val | Pro | Tyr | Arg | Tyr | Phe | Gln | Pro | Phe | Gly | Phe | Gly | Pro | Arg |
| | | | | 425 | | | | | 430 | | | | 435 | |
| Gly | Cys | Ala | Gly | Lys | Tyr | Ile | Ala | Met | Val | Met | Met | Lys | Ala | Ile |
| | | | | 440 | | | | | 445 | | | | 450 | |
| Leu | Val | Thr | Leu | Leu | Arg | Arg | Phe | His | Val | Lys | Thr | Leu | Gln | Gly |
| | | | | 455 | | | | | 460 | | | | 465 | |
| Gln | Cys | Val | Glu | Ser | Ile | Gln | Lys | Ile | His | Asp | Leu | Ser | Leu | His |
| | | | | 470 | | | | | 475 | | | | 480 | |
| Pro | Asp | Glu | Thr | Lys | Asn | | | | | | | | | |
| | | | | 485 | | | | | | | | | | |

<210> 16

<211> 466

<212> PRT

<213> Gallus gallus

<400> 16

Met Pro Val Ala Thr Val Pro Ile Ile Ile Leu Ile Cys Phe Leu
005 010 015
Phe Leu Ile Trp Asn His Glu Glu Thr Ser Ser Ile Pro Gly Pro
020 025 030
Gly Tyr Cys Met Gly Ile Gly Pro Leu Ile Ser His Gly Arg Phe
035 040 045
Leu Trp Met Gly Val Gly Asn Ala Cys Asn Tyr Tyr Asn Lys Thr
050 055 060
Tyr Gly Glu Phe Val Arg Val Trp Ile Ser Gly Glu Glu Thr Phe
065 070 075
Ile Ile Ser Lys Ser Ser Ser Val Phe His Val Met Lys His Trp
080 085 090
Asn Tyr Val Ser Arg Phe Gly Ser Lys Leu Gly Leu Gln Cys Ile
095 100 105
Gly Met Tyr Glu Asn Gly Ile Ile Phe Asn Asn Asn Pro Ala His
110 115 120
Trp Lys Glu Ile Arg Pro Phe Phe Thr Lys Ala Leu Ser Gly Pro
125 130 135
Gly Leu Val Arg Met Ile Ala Ile Cys Val Glu Ser Thr Ile Val
140 145 150
His Leu Asp Lys Leu Glu Glu Val Thr Thr Glu Val Gly Asn Val
155 160 165
Asn Val Leu Asn Leu Met Arg Arg Ile Met Leu Asp Thr Ser Asn
170 175 180
Lys Leu Phe Leu Gly Val Pro Leu Asp Glu Ser Ala Ile Val Leu
185 190 195
Lys Ile Gln Asn Tyr Phe Asp Ala Trp Gln Ala Leu Leu Leu Lys
200 205 210
Pro Asp Ile Phe Phe Lys Ile Ser Trp Leu Cys Lys Lys Tyr Glu
215 220 225
Glu Ala Ala Lys Asp Leu Lys Gly Ala Met Glu Ile Leu Ile Glu
230 235 240
Gln Lys Arg Gln Lys Leu Ser Thr Val Glu Lys Leu Asp Glu His
245 250 255
Met Asp Phe Ala Ser Gln Leu Ile Phe Ala Gln Asn Arg Gly Asp
260 265 270
Leu Thr Ala Glu Asn Val Asn Gln Cys Val Leu Glu Met Met Ile
275 280 285
Ala Ala Pro Asp Thr Leu Ser Val Thr Leu Phe Ile Met Leu Ile
290 295 300
Leu Ile Ala Asp Asp Pro Thr Val Glu Glu Lys Met Met Arg Glu
305 310 315
Ile Glu Thr Val Met Gly Asp Arg Glu Val Gln Ser Asp Asp Met
320 325 330
Pro Asn Leu Lys Ile Val Glu Asn Phe Ile Tyr Glu Ser Met Arg
335 340 345
Tyr Gln Pro Val Val Asp Leu Ile Met Arg Lys Ala Leu Gln Asp

| | | |
|-------------------------------------|-------------------------|-----|
| 350 | 355 | 360 |
| Asp Val Ile Asp Gly Tyr Pro Val Lys | Lys Gly Thr Asn Ile Ile | |
| 365 | 370 | 375 |
| Leu Asn Ile Gly Arg Met His Lys Leu | Glu Phe Phe Pro Lys Pro | |
| 380 | 385 | 390 |
| Asn Glu Phe Ser Leu Glu Asn Phe Glu | Lys Asn Val Pro Ser Arg | |
| 395 | 400 | 405 |
| Tyr Phe Gln Pro Phe Gly Phe Gly Pro | Arg Gly Cys Val Gly Lys | |
| 410 | 415 | 420 |
| Phe Ile Ala Met Val Met Met Lys Ala | Ile Leu Val Thr Leu Leu | |
| 425 | 430 | 435 |
| Arg Arg Cys Arg Val Gln Thr Met Lys | Gly Arg Gly Leu Asn Asn | |
| 440 | 445 | 450 |
| Ile Gln Lys Asn Asn Asp Leu Ser Met | His Pro Ile Glu Arg Gln | |
| 455 | 460 | 465 |

Pro

<210> 17
<211> 486
<212> PRT
<213> Poephila guttata

<400> 17

| | | |
|-------------------------------------|-------------------------|-----|
| Met Phe Leu Glu Met Leu Asn Pro Met | His Tyr Asn Val Thr Ile | |
| 005 | 010 | 015 |
| Met Val Pro Glu Thr Val Pro Val Ser | Ala Met Pro Leu Leu | |
| 020 | 025 | 030 |
| Ile Met Gly Leu Leu Leu Ile Arg | Asn Cys Glu Ser Ser Ser | |
| 035 | 040 | 045 |
| Ser Ile Pro Gly Pro Gly Tyr Cys Leu | Gly Ile Gly Pro Leu Ile | |
| 050 | 055 | 060 |
| Ser His Gly Arg Phe Leu Trp Met Gly | Ile Gly Ser Ala Cys Asn | |
| 065 | 070 | 075 |
| Tyr Tyr Asn Lys Met Tyr Gly Glu Phe | Met Arg Val Trp Ile Ser | |
| 080 | 085 | 090 |
| Gly Glu Glu Thr Leu Ile Ile Ser Lys | Ser Ser Ser Met Val His | |
| 095 | 100 | 105 |
| Val Met Lys His Ser Asn Tyr Ile Ser | Arg Phe Gly Ser Lys Arg | |
| 110 | 115 | 120 |
| Gly Leu Gln Cys Ile Gly Met His Glu | Asn Gly Ile Ile Phe Asn | |
| 125 | 130 | 135 |
| Asn Asn Pro Ser Leu Trp Arg Thr Val | Arg Pro Phe Phe Met Lys | |
| 140 | 145 | 150 |
| Ala Leu Thr Gly Pro Gly Leu Ile Arg | Met Val Glu Val Cys Val | |
| 155 | 160 | 165 |
| Glu Ser Ile Lys Gln His Leu Asp Arg | Leu Gly Asp Val Thr Asp | |
| 170 | 175 | 180 |
| Asn Ser Gly Tyr Val Asp Val Val Thr | Leu Met Arg His Ile Met | |

| 185 | 190 | 195 |
|---|-----|-----|
| Leu Asp Thr Ser Asn Thr Leu Phe Leu Gly Ile Pro Leu Asp Glu | | |
| 200 | 205 | 210 |
| Ser Ser Ile Val Lys Lys Ile Gln Gly Tyr Phe Asn Ala Trp Gln | | |
| 215 | 220 | 225 |
| Ala Leu Leu Ile Lys Pro Asn Ile Phe Phe Lys Ile Ser Trp Leu | | |
| 230 | 235 | 240 |
| Tyr Arg Lys Tyr Glu Arg Ser Val Lys Asp Leu Lys Asp Glu Ile | | |
| 245 | 250 | 255 |
| Glu Ile Leu Val Glu Lys Lys Arg Gln Lys Val Ser Ser Ala Glu | | |
| 260 | 265 | 270 |
| Lys Leu Glu Asp Cys Met Asp Phe Ala Thr Asp Leu Ile Phe Ala | | |
| 275 | 280 | 285 |
| Glu Arg Arg Gly Asp Leu Thr Lys Glu Asn Val Asn Gln Cys Ile | | |
| 290 | 295 | 300 |
| Leu Glu Met Leu Ile Ala Ala Pro Asp Thr Met Ser Val Thr Leu | | |
| 305 | 310 | 315 |
| Tyr Val Met Leu Leu Ile Ala Glu Tyr Pro Glu Val Glu Thr | | |
| 320 | 325 | 330 |
| Ala Ile Leu Lys Glu Ile His Thr Val Val Gly Asp Arg Asp Ile | | |
| 335 | 340 | 345 |
| Arg Ile Gly Asp Val Gln Asn Leu Lys Val Val Glu Asn Phe Ile | | |
| 350 | 355 | 360 |
| Asn Glu Ser Leu Arg Tyr Gln Pro Val Val Asp Leu Val Met Arg | | |
| 365 | 370 | 375 |
| Arg Ala Leu Glu Asp Asp Val Ile Asp Gly Tyr Pro Val Lys Lys | | |
| 380 | 385 | 390 |
| Gly Thr Asn Ile Ile Leu Asn Ile Gly Arg Met His Arg Leu Glu | | |
| 395 | 400 | 405 |
| Tyr Phe Pro Lys Pro Asn Glu Phe Thr Leu Glu Asn Phe Glu Lys | | |
| 410 | 415 | 420 |
| Asn Val Pro Tyr Arg Tyr Phe Gln Pro Phe Gly Phe Gly Pro Arg | | |
| 425 | 430 | 435 |
| Ser Cys Ala Gly Lys Tyr Ile Ala Met Val Met Met Lys Val Val | | |
| 440 | 445 | 450 |
| Leu Val Thr Leu Leu Lys Arg Phe His Val Lys Thr Leu Gln Lys | | |
| 455 | 460 | 465 |
| Arg Cys Ile Glu Asn Met Pro Lys Asn Asn Asp Leu Ser Leu His | | |
| 470 | 475 | 480 |
| Leu Asp Glu Asp Ser Pro | | |
| 485 | | |

<210> 18

<211> 50

<212> PRT

<213> Homo sapiens

<400> 18

Arg Asn Val Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Val Leu Ala Phe Ser Lys Ser Cys His Leu Pro Trp
020 025 030
Ala Ser Gly Leu Glu Thr Leu Asp Ser Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Gly Tyr Ser
050

<210> 19
<211> 50
<212> PRT
<213> Pan troglodytes

<400> 19
Arg Asn Met Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Val Leu Ala Phe Ser Lys Ser Cys His Leu Pro Trp
020 025 030
Ala Ser Gly Leu Glu Thr Leu Asp Ser Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Gly Tyr Ser
050

<210> 20
<211> 50
<212> PRT
<213> Gorilla gorilla

<400> 20
Arg Asn Met Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Val Leu Ala Phe Ser Lys Ser Cys His Leu Pro Trp
020 025 030
Ala Ser Gly Leu Glu Thr Leu Asp Ser Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Gly Tyr Ser
050

<210> 21
<211> 50
<212> PRT
<213> Orangutan

<400> 21
Arg Asn Val Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Val Leu Ala Phe Ser Lys Ser Cys His Leu Pro Trp

020 025 030
Ala Ser Gly Leu Glu Thr Leu Asp Arg Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Gly Tyr Ser
050

<210> 22
<211> 50
<212> PRT
<213> Rhesus monkey

<400> 22
Arg Asn Val Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Phe Ser Lys Ser Cys His Leu Pro Leu
020 025 030
Ala Ser Gly Leu Glu Thr Leu Glu Ser Leu Gly Asp Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 23
<211> 50
<212> PRT
<213> Rattus norvegicus

<400> 23
Gln Asn Val Leu Gln Ile Ala His Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Phe Ser Lys Ser Cys Ser Leu Pro Gln
020 025 030
Thr Arg Gly Leu Gln Lys Pro Glu Ser Leu Asp Gly Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 24
<211> 50
<212> PRT
<213> Rattus norvegicus

<400> 24
Gln Asn Val Leu Gln Ile Ala His Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Phe Ser Lys Ser Cys Ser Leu Pro Gln
020 025 030
Thr Arg Gly Leu Gln Lys Pro Glu Ser Leu Asp Gly Val Leu Glu
035 040 045

Ala Ser Leu Tyr Ser
050

<210> 25

<211> 50

<212> PRT

<213> Mus musculus

<400> 25

Gln Asn Val Leu Gln Ile Ala Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Phe Ser Lys Ser Cys Ser Leu Pro Gln
020 025 030
Thr Ser Gly Leu Gln Lys Pro Glu Ser Leu Asp Gly Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 26

<211> 50

<212> PRT

<213> Ancestral sequence

<400> 26

Arg Asn Val Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Ser Ser Lys Ser Cys Pro Leu Pro Gln
020 025 030
Ala Arg Gly Leu Glu Thr Leu Glu Ser Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 27

<211> 50

<212> PRT

<213> Sus scrofa

<400> 27

Arg Asn Val Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Ser Ser Lys Ser Cys Pro Leu Pro Gln
020 025 030
Ala Arg Ala Leu Glu Thr Leu Glu Ser Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 28
<211> 50
<212> PRT
<213> Ovis

<400> 28
Arg Asn Val Ile Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Ala Ser Lys Ser Cys Pro Leu Pro Gln
020 025 030
Val Arg Ala Leu Glu Ser Leu Glu Ser Leu Gly Val Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 29
<211> 50
<212> PRT
<213> Bos taurus

<400> 29
Arg Asn Val Val Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Ala Ser Lys Ser Cys Pro Leu Pro Gln
020 025 030
Val Arg Ala Leu Glu Ser Leu Glu Ser Leu Gly Val Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 30
<211> 50
<212> PRT
<213> Dog

<400> 30
Arg Asn Val Val Gln Ile Ser Asn Asp Leu Glu Asn Leu Arg Asp
005 010 015
Leu Leu His Leu Leu Ala Ser Ser Lys Ser Cys Pro Leu Pro Arg
020 025 030
Ala Arg Gly Leu Glu Thr Phe Glu Ser Leu Gly Gly Val Leu Glu
035 040 045
Ala Ser Leu Tyr Ser
050

<210> 31
<211> 28
<212> PRT

<213> Sus scrofa

<400> 31

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | His | Tyr | Thr | Cys | Arg | Phe | Gly | Ser | Lys | Leu | Gly | Leu | Glu | Cys |
| | | | | | | | | | | | | | | |
| 005 | | | | | | | | 010 | | | | | | 015 |
| Ile | Gly | Met | His | Glu | Lys | Gly | Ile | Met | Phe | Asn | Asn | Asn | | |
| | | | | | | | | | | | | | | |
| 020 | | | | | | | | 025 | | | | | | |

<210> 32

<211> 28

<212> PRT

<213> Sus scrofa

<400> 32

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | His | Tyr | Thr | Ser | Arg | Phe | Gly | Ser | Lys | Pro | Gly | Leu | Gln | Phe |
| | | | | | | | | | | | | | | |
| 005 | | | | | | | | 010 | | | | | | 015 |
| Ile | Gly | Met | His | Glu | Lys | Gly | Ile | Ile | Phe | Asn | Asn | Asn | | |
| | | | | | | | | | | | | | | |
| 020 | | | | | | | | 025 | | | | | | |

<210> 33

<211> 28

<212> PRT

<213> Sus scrofa

<400> 33

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | His | Tyr | Thr | Ser | Arg | Phe | Gly | Ser | Lys | Pro | Gly | Leu | Glu | Cys |
| | | | | | | | | | | | | | | |
| 005 | | | | | | | | 010 | | | | | | 015 |
| Ile | Gly | Met | Tyr | Glu | Lys | Gly | Ile | Ile | Phe | Asn | Asn | Asp | | |
| | | | | | | | | | | | | | | |
| 020 | | | | | | | | 025 | | | | | | |

<210> 34

<211> 28

<212> PRT

<213> White lipped peccary

<400> 34

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | His | Tyr | Thr | Ser | Arg | Phe | Gly | Ser | Lys | Pro | Gly | Leu | Gln | Phe |
| | | | | | | | | | | | | | | |
| 005 | | | | | | | | 010 | | | | | | 015 |
| Ile | Gly | Met | His | Glu | Lys | Gly | Ile | Ile | Phe | Asn | Asn | Asn | | |
| | | | | | | | | | | | | | | |
| 020 | | | | | | | | 025 | | | | | | |

<210> 35

<211> 83

<212> DNA

<213> Sus scrofa

<400> 35

CAATCATTAC ACGTGCCGAT TTGGCAGCAA ACTTGGGTTG GAATGCATTG GCATGCATGA 60
AAAAGGCATCA TGTTAACAA TAA

<210> 36
<211> 84
<212> DNA
<213> Sus scrofa

<400> 36
TAGTCACTAC ACATCCCGAT TTGGCAGCAA ACCTGGGTTG CAGTCATTG GCATGCATGA 60
GAAAGGCATT ATATTCAACA ATAA

<210> 37
<211> 84
<212> DNA
<213> Sus scrofa

<400> 37
CAGTCACTAC ACATCCCGAT TCGGCAGCAA ACCTGGGTTG GAGTGCATCG GCATGTATGA 60
GAAGGGCATC ATATTTAATA ATGA

<210> 37
<211> 84
<212> DNA
<213> White lipped peccary

<400> 37
CAGTCACTAC ACATCCCGAT TCGGCAGCAA ACCTGGGTTG CAGTCATTG GAATGCATGA 60
GAAAGGCATC ATATTTAACAA ACAA